Art, Art history and Systems-Theory

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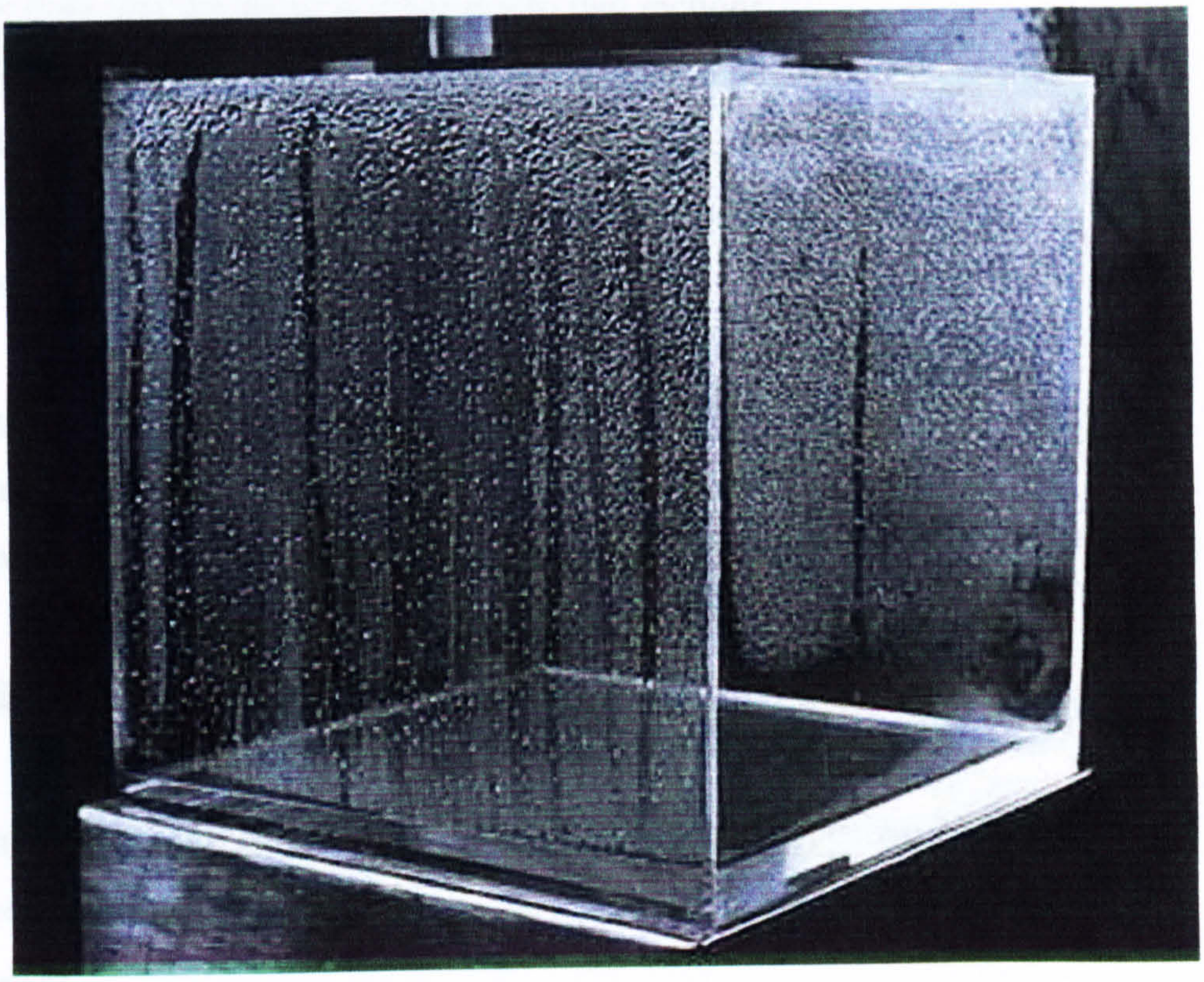

Haacke: *Condensation Cube*, (1965)

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Foreword

Spiral Jetty in 2003

1 - Motivations

This thesis grew out of a number of questions which I wanted to see resolved.

Firstly: I had encountered several passing references made to systems-theory, cybernetics, the systems-thinking approach and so forth; but was unable to determine exactly on what terms these vocabularies were being evoked. These references appeared in texts connected to both of my research interests: art after Modernism *and* Historiography. For example conceptual artists working with systems and seriality, such as Burnham, Haacke, Bochner and Sol-Lewitt, have made reference to 'systems' in their work; and Robert Smithson, who peppered his writings with allusions to 'systems,' included von Bertlanffy's *General System's Theory* and Weiner's *Cybernetics* amongst his library of scientific texts.[1] Some critical writing had picked up on this tendency (for example Lawrence Alloway's short paper, 'Network: the Artwork Described as a System,'[2] (1972) and in particular Burnham's writings[3]) But this can be observed as a now passed historical moment, interconnected with the prevalence of conceptual art and the 'Dematerialisation of the Art Object' in the late 1960's and early

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[1] See Ann Reynolds, *Robert Smithson: Learning from New Jersey and Elsewhere*, (MIT Press, 2003) for the appendix: a catalogue of Smithson's entire library.
[2] Alloway, 'Network: the Artwork Described as a System,' *Artforum* (1972) Reprinted in Alloway, *Network: Art and the Complex Present*, (UMI Research Publishing, 1984)
[3] For example Burnham wrote, "[The] cultural obsession with the art object is slowly disappearing and being replaced by what might be called 'systems consciousness.' Actually, this shifts from the direct shaping of matter to a concern for organizing quantities of energy and information." In Burnham, *Beyond Modern Sculpture: The Effects of Science and Technology on the Sculpture of This Century* (George Braziller, 1968) See also by Burnham: 'Systems Esthetics' *Artforum*, Vol. 7, No. 1, (September 1968) pg. 30-35 - also online at: **http://cadre.sjsu.edu/art103/spring98/readings/system.html** (consulted Dec. 2003); 'Real Time Systems,' *Artforum*, Vol. 8, No.1, (September 1969) pg. 49-55; 'The Aesthetics of Intelligent Systems,' in *On the Future of Art* (Viking Press, 1970), pg 95-122

Seventies.[4] In addition, in 1984 Michael Ann Holly had made a passing reference to von Bertalanffy's *General System's Theory* in her comparison of Riegl and Panofsky.[5] She was later to remark to me that she had done so because at a certain time *Systems Theory* was very fashionable and was being vigorously discussed across a wide variety of disciplines; and the implications seemed very exciting.[6]

However, if it seems that this appetite for the application of even a very general systems-thinking approach within artistic, cultural or historical analyses has abated somewhat then this is only within the English-speaking world of Art and Art History. In German speaking academia, for example, Systems-Theory is well-established in its application within sociology; centred particularly around the work of Niklas Luhmann. To the contrary in English academia, and Art History in particular, he has provoked little interest; and there has still been no systematic attempt in English to apply his systems-theoretical approach to Art Historical issues. This is undoubtedly a reflection of the fact that he was, until very recently, not translated in English (*Social Systems* translated in 1997 and *Art as a Social System* in 2000) and his death in 1998. Independently of Luhmann, and outside the humanities, however the discourse of Systems-Thinking itself is a burgeoning discipline with applications as diverse as economics, evolutionary biology, management, and so forth. The area of application

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[4] Key exhibitions which exemplify the theme of conceptualism as it can be applied to 'systems' and Lucy Lippard's historical conception of the *dematerialised* art object are: *Information* (July, 1970, MOMA) and *Software: Information Technology – Its New Meaning for Arts*, (1970, Jewish Museum, NY) See too: Lippard, *Six Years: the Dematerialization of the Art Object*, (University of California Press, 1997 [1974])

[5] Michael Ann Holly, *Panofsky and the Foundations of Art History*, (Cornell University Press, 1984) pg. 70, 76, 79

[6] Michael Ann Holly in conversation with the author at the colloquium: *Framing Art History: Reflections on the discipline*, (A European Science Foundation Exploratory Workshop,) Edinburgh College of Art, March 13-15, 2003

that has proved particularly exciting is the ongoing dialogue between cognitive science and philosophy when framed by the discursive strategies of systems, complexity, emergence and so forth[7].

Secondly: As I discuss in the introduction, where I outline the central problem which this thesis seeks to address, I feel that it is often the case that the radical implications of post-modern art practice are lost because they are observed through the critical lens of a historical and critical model which is, at heart, modernist. By saying this I mean to expand upon Craig Owens' claim that:

> The poststructuralist critique could not possibly be absorbed by art history without a significant reduction in its polemical force, or without a total transformation of art history itself.[8]

beyond the linguistic application he proposed for it; that is, to include art practice as part of that critique. In other words I work from the assumption that art after Modernism challenges us to find new critical paradigms by which to account for it. This thesis is an attempt to investigate Systems Theory as such a paradigm.

2 - Implications

There are two further points that I wish to make about the adoption of the systems-theoretical approach as an art historian. These points also reflect

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[7] For an recent survey of these debates see: Petitot, Varela, Pachoud & Roy (eds.) *Naturalizing Phenomenology: Issues in Contemporary Phenomenology and Cognitive Science*, (Stanford University Press, 2000). I discuss the systems-theoretical approach to cognitive models in more detail in chapter 4.

[8] Owens, 'Representation, Appropriation and Power,' in Owens, *Beyond Recognition*, (University of California Press, 1992)

my joint research concerns in late 20th Century artistic practice and historiography. They are:

Firstly: I argue that it is particularly effective in dealing with art after Modernism which is characterised by, amongst other things: non-visual qualities; unstable, or de-materialised physicality and an engagement (often politicised) with the institutional systems of support. By prioritising the systems of support over the individual work of art, such an approach is not tied by an umbilical cord of vision to an analysis based on what individual works of art look like.

Secondly: I have identified a tradition within art historical writing, what Podro called the *Critical Historians of Art*, that is known in the German tradition as *Kunstwissenschaft* (the systematic, or rigorous study of art.) I have done so both as a means of clarifying what I mean when I say Art History; but also as a means of identifying a tradition within art history of self-reflexivity and systematic investigation of methods and limits. And this is something found in non-German scholarship too, as Podro said:

> This German tradition is not altogether isolated; it is not without relation to the writing of Ruskin, Pater and Fry in England, or to Viollet-le Duc, Taine and later Focillon and Francastel in France, or to that of Croce, Leonello Venturi and others in Italy.[9]

From a systems-theoretical perspective it is an interesting question in its own right to ask why the *Critical Historians of Art* have become the dominant mode of historiography (since the 1980s at least). As a discourse it has become, in systems-theoretical terms, 'locked-in' (via positive feedback) which certainly makes it a valid one to engage with.

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[9] Podro, *The Critical Historians of Art*, (Yale University Press, 1982) pg. xxi

It is my argument that the Systems-Theoretical approach to art history ultimately belongs to this tradition and is not in opposition to it. In summary, it is not my intention to either attack or defend a straw-man, or flimsy stereotype of what art history is. I am rather, throughout this thesis, seeking a body of work, a canon, or discursive system, with which to engage. In what follows I argue that the systems-theoretical approach to art history is a continuation of this rich and worthy heritage - that is of finding an historical model to match the art of scrutiny - not a break from it.

SECTION ONE

Conceptual Issues

Introduction:

The Problem of Observing Spiral Jetty

1 - Introduction

In its most radical form Post-modern art presents a significant problem to traditional Art Historical method; that of how best to account for its paradox and complexity. In the following chapter I use Robert Smithson's *Spiral Jetty* (1970; Utah) to investigate this theme more fully. My motivation in doing this is to introduce the central challenge which my thesis as a whole seeks to address; that of finding a vocabulary by which to discuss artistic practice and discourse produced in the 2nd half of the 20th Century. And to do so in a manner which recognises that practice's distinction from modernism by distancing its own discursive observations from the Modern paradigms of traditional art historical vocabularies. In the chapters following this one I introduce my thesis that the systems-theoretical approach to Art History provides such vocabularies and thus new, and effective heuristic strategies.

An implicit suggestion in this opening chapter (and in fact the thesis as a whole) is that these problems are not unique to *Spiral Jetty* but can instead be seen as an allegory for the problems which Art Historians must constantly negotiate in order to practice. This is because whilst an account of *Spiral Jetty* must grapple with the problems with the tried and tested methods the art historian have at their disposal these are problems which any study based on the analysis of objects and the way they look will have to confront.

A first hand experience of *Spiral Jetty* is difficult to achieve. Having negotiated the relative remoteness of *Spiral Jetty*, one encounters first hand the physical volatility of the sculpture which makes it so hard to observe.

Smithson: *Spiral Jetty*, (1970; Utah) in 2003

Picture – New York Times Magazine

This means that if you are prepared to make the hour long drive on dusty tracks to the edge of the Salt Lake there is no guarantee that you'll be able to see the sculpture itself. In 1972 the brackish waters of the salt lake rose to submerge it and it has emerged at various points since then with no regularity.

This provides a specific example of a problem which most art historians will have to face at one point or another in their career - the loss of their object.

In his edited companion to the work of Robert Smithson Robert Hobbs gives the following physical description of the location and composition of *Spiral Jetty* -

> Spiral Jetty, Rozel Point, Great Salt Lake, Utah, April 1970; Mud, precipitated salt crystals, rocks, water; coil 1500 ft long and 15 ft wide.[10]

But this is not the whole story. *Spiral Jetty* is a complex work; we might even call it a system. Different aspects of this system include: the Sculpture in the Salt Lake, which Smithson completed in 1970; the 35 minute 16mm film which Smithson made; the essay Smithson wrote about the work; the photographs taken by Smithson and Gianfranco Gorgoni of the work and its creation; the sketches Smithson made in preparation; the performance of the work's creation, and so on, and so on. And this extends beyond the work itself to the whole system of essays, photographs, films projects and so forth which have been produced in response to the work.

Given these multiple sites (and, to use Smithson's own term 'non-sites') which offer themselves up in competition for one's critical attention the problematic of how to prioritise which aspect to focus on becomes the

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[10] Hobbs, *Robert Smithson; Sculpture*, (Smithmark, 1981) pg. 191

central feature of the way in which the work is approached. As Owens has observed:

> Like the nonsite the Jetty is not a discreet work, but one link in a chain of signifiers which summon and refer to one another in a dizzying spiral. For where else does the Jetty exist except in the film which Smithson made, the narrative he published, the photographs which accompany that narrative, and the various maps, diagrams, drawings, etc. , he made about it? Unintelligible at close range, the spiral form of the Jetty is completely intuitable only from a distance, and that distance is most often achieved by imposing a text between viewer and work... That Smithson thus transformed the visual field into a textual one represents one of the most significant aesthetic "events" of our decade; and the publication of his collected writings constitutes a challenge to criticism to come to terms with the textual nature of his work, and of postmodernism in general. That challenge is formidable, since it requires the jettisoning of most of our received notions about art; it can only be acknowledged here.[11]

This reading of *Spiral Jetty* follows Owens' own political agenda and his prioritisation of the textual forms part a polemic application of the literary form of Post-Structural critique within the visual field of art history. It may be observed that Owens' politicised application of the strategies of deconstruction took place at a particular historical moment. It may also be claimed that the wake of the waves of deconstruction which crashed upon the island shores of Art History have abated somewhat. Nevertheless the central challenge which Owens identifies that *Spiral Jetty* presents to Art History remains. This is a challenge which goes to the very heart of Art Historical method and calls its very reliance upon visuality and iconography into question. For if, as Owens states, *Spiral Jetty* is but one link in a chain

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[11] Craig Owens, 'Earthwords', *Beyond Recognition*, (University of California Press, 1992), pg. 47

of signifiers which are not only visual but textual, aural, oral and even olfactory, then how is it that we as Art Historians should approach it? It would seem that the Art Historian's trusty apparatus of formal analysis and visual iconography - of doughty detective work and sleuthing in the archives to find things that look like other things (like spirals, circles and shoes) will not work in the face of a work which will, by its very complex nature, resist such easy simplification. This is because with work such as this it is the very visuality, upon which the method of iconography, relies is itself radically destabilised. Central to this destabilisation is the questioning of the structural form of iconography itself. This challenge involves an interrogation of the positing of a discreet, direct and logical symbolic correspondence within the visual icon (or sign) to that which it signifies and the system which mediates this representation.

2 - Sensism

Any mode of analysis which limits itself to one sense alone will be a flawed account of experience. This is because it does not recognise the multi-sensory nature of that experience and as a result will not be a satisfactory basis for a thorough historical account. For the majority of us we will not have a visual impression without attendant experiences received from the other senses; hearing, touch, taste and smell. Because this is something which forms an integral part of experiential life it requires little proof in order to be accepted. However - what has also been suggested is that the senses can effect one another in an interconnected interaction. This is to say that individual senses can both intensify, diminish and alter the role and

input of other senses depending on how experience is framed by understanding at a particular time.

That our experience is multi-sensory can be demonstrated by the ways in which the senses can influence one another. Chef Heston Blumenthal gives the following example of how perception is influenced across the senses:

> It is possible to alter the perception of the texture of and, by association, the freshness of a potato crisp by using sound. Listening, (through headphones) to the crunching sound made while eating crisps has a dramatic effect on the level of crispness of the crisp itself. Increase the frequency and or volume and the crisp becomes crunchier and perceptively fresher. Turn the sound or frequency down however and it becomes less crunchy and stale. So here... we have used sound to create an illusion.[12]

At his restaurant The Fat Duck, Blumenthal uses this type of cross-sensory illusion in his own cookery to trick the taster into new and unexpected tastes and sensations by giving them, for example, something that tastes different from what is expected from the way that it looks. An example of this is an orange and beetroot jelly which is presented as a slice of two coloured jellies; orange and deep purple. The diner is fooled by their sight because one expects, due to the visual prompts of the jelly's colours that a mouthful taken from the left will tastes of orange while the purple gel, on the right will taste of beetroot. "In fact", Blumenthal explains, "it is the other way round! The expected orange gel is made from yellow beetroot juice and the beetroot [coloured gel] from blood orange juice. So here, the sense of sight is fooling the taster's expectation." He gives a further example of a paté des fruits which is served as a petit four:

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[12] Heston Blumenthal, *Fat Duck News, 'Pour La Science'*, Emailed newsletter, (April, 2003)

It is made from pumpkin juice. If this is eaten blindfolded, it has a slightly earthy character and a subtle taste of pumpkin. When the blindfold is removed and the paté tasted again it tastes of apricot. Here, the taster focuses purely on the flavour. When the blindfold is removed however, the sense of sight comes into play once more and begins to fool. It seems that the presence of acidity produced by the tartaric acid (required to set the gel) along with the colour helps to steer the taster into thinking that it has a fruity taste.[13]

This view can also be supported by various experiments into the workings of perception, from both a physiological and psychological perspective, which identify its cross-modal nature.

In the examples of *ventriloquism,* the relationships between audio and visual perception have been investigated with a view to seeking how to describe the two modes of perception can become conflated. *Ventriloquism* occurs when we attribute the source of a sound to a source based upon a visual prompt. This is like when we are 'fooled' into attributing the sound of the ventriloquist's dummy to the dummy itself, or when we 'forget' that voices of actors on the cinema screen are not emanating from the moving image itself but instead from loudspeakers. As Bertelson noted from his own experiments:

> The example of the ventriloquist is interesting to psychologists because it illustrates the perceptual integration of data from different modalities, here vision and audition. Just as speakers produce streams of changes available to both ear and eye, most real life events produce correlated inputs to several of our senses. Yet, most research on perception considers one modality at a time. In comparison, the problems of how simultaneous inputs to several modalities are combined has received relatively little attention.[14]

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[13] Heston Blumenthal, *Fat Duck News, 'Pour La Science'*, Emailed newsletter, (April, 2003)

[14] Bertleson, 'Starting From the Ventriloquist; The Perception of Multimodal Events,' in Sabourin, Fergus et al (Eds.) *Advances in Psychological Science, vol. 2: Biological and Cognitive Aspects*, (Psychology Press, 1998) pg. 419-439.

Ventriloquism occurs because experience is constructed from the manifold of perception (in the Kantian sense) which is then synthesised into a conceptual unity by understanding. It is in this synthesis where ambiguities can arise as Bertelson has identified:

> In real life, the stimulation of different senses occurs all the time. Some stimuli originate in the same external events, others in separate ones. How does the system know which data belong together? This is the problem of *pairing*, in the terms of Wallach (1968) and Epstein (1975), or of the *unity assumption*, following Welch and Warren (1980).[15]

In one particular experiment subjects were played sounds to either their left or their right synchronously with a flashing LED light source again to the right and left. As Bertleson surmised: "the results so far supported the notion of an automatic attraction of the apparent locations of the sounds by the flashing light,"[16] which is to say that given the visual prompt of the light simultaneously with the sound the subject was more likely to attribute the sound as coming from the same side as the light regardless of the actual sound source. Further examples of *ventriloquism* include those by Saldaña and Rosenblum in which the decision of a subject in identifying the sounds of a cello being either plucked or bowed were strongly influenced by the visual prompt of a cello being plucked or bowed.[17] In the McGurk and

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15 Bertleson, 'Starting From the Ventriloquist; The Perception of Multimodal Events,' in Sabourin, Fergus et al (Eds.) *Advances in Psychological Science, vol. 2: Biological and Cognitive Aspects*, (Psychology Press, 1998) pg. 419-439. The references referred to are: Wallach, 'Informational Discrepancy as a Basis of Perceptual Adaptation.' in Freeman (Ed.), *The Neuropsychology of Spatially Orientated Behaviour*, (Dorsey Press, 1968); Epstein, 'Recalibration by Pairing: a Process of Perceptual Learning,' *Perception*, 4, (1975), pg. 59-74; Welch & Warren, 'Immediate Perceptual Response to Intersensory Discrepancy,' *Psychological Bulletin*, 88, (1980) pg. 638-667

16 Bertleson, 'Starting From the Ventriloquist; The Perception of Multimodal Events,' in Sabourin, Fergus et al (Eds.) *Advances in Psychological Science, vol. 2: Biological and Cognitive Aspects*, (Psychology Press, 1998) pg. 428

17 Saldaña & Rosenblum, 'Visual Influences on Auditory Pluck and Bow Judgements,' *Perception and Psychophysics*, 54, (1993), pg. 406-416

Macdonald experiment short speech sounds were dubbed over video recordings of mouths uttering different sounds which lead to the visual prompts influencing the sounds that were heard. It was found that when the sound *baba* was played simultaneously with the video of a mouth uttering *gaga* then a 'large proportion' of the subjects heard the sound DADA.[18]

Additional studies which investigate the phenomenon of *ventriloquism* across different sensory modalities all suggest that our sensory experiences are not discreet but interconnected to such an extent so as to be influential to one another. This is demonstrated by the study of moving visual prompts such as that of, 'The Ventriloquist in Motion: Illusory Capture of Dynamic Information Across Sensory Modalities' in which it was observed that when viewing a shift of lights from left to right synchronously with a sound source shifting in the opposite direction the results achieved demonstrated the apparent direction of a sound, as opposed to just the source, could also be influenced by visual prompts.[19]

What the above examples demonstrate is that the nature of our experience is such that we will have many sensory impressions at once that can both influence and conflict with one another. This leads us to

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[18] And likewise the sound *gaga* superimposed on the visual prompt *baba* lead to the sound BABGA being reported. In McGurk & MacDonald, 'Hearing Lips and Seeing Voices,' *Nature*, 264, (1976), pg. 746-48

[19] 'The results of the present study demonstrate a strong crossmodal interaction in the domain of motion perception. In particular our findings suggest the obligatory perceptual integration of dynamic information across sensory modalities, often producing an illusory reversal if the true direction of the auditory apparent motion (originally unambiguous if presented in isolation). Further, support for the uniqueness of this phenomenon comes from the fact that dynamic capture was shown to depend on apparent motion being captured.' Soto-Faraco, Lyons, Gazzaniga, Spence, Kingstone, 'The Ventriloquist in Motion: Illusory Capture of Dynamic Information Across Sensory Modalities,' *Cognitive Brain Research*, 14, (2002) pg. 139-146

experience discontinuous but simultaneous events (such as those which we see at hear at the same time) as causally related. Further it has also been shown that the occurrence of cross-modality across the senses is not limited to sight and sound alone and can extend to smell, taste and touch. Given the specific example of smell it has been demonstrated that relative intensity of smell can be influenced by both visual and auditory sources to such an extent that by focusing ones attention upon the experience of one sense one can diminish the role of the other senses. This is because in certain situations we might focus attention onto a particular sensory mode to the detriment of the other senses, as Spence et al explain:

> Taken together with previous results from studies attending to audition, vision and touch, our results support the view that there is a common pool of attentional resources for the processing of auditory, visual, tactile and olfactory stimuli. It appears that people can selectively direct this pool of attentional resources to a particular modality (or modalities), resulting in the preferential processing of stimuli in that (or those) modalities compared with the processing of stimuli in the other "unattended" modalities[20]

In support of his various experiments (of which the above experiments are exemplary) into the diverse and interconnected nature of sensory experience experimental Psychologist Charles Spence has called this multisensory aspect of experience *Sensism*[21].

Spence has called for a 'regaining of sensory balance.' He claims that the contemporary world is one in which we are subject to a 'sensory

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[20] Spence, McGlone, Kettenmann, Kobal, 'Attention to Olfaction; A Psychophysical Investigation,' *Experimental Brain Research*, [Published online] (10th April, 2001). The results of this experiment were reported as follows; 'symbolic auditory clues which predict the likely target modality on a trial-by-trial basis can influence discrimination latencies and/or accuracy for olfactory and visual targets presented in the expected versus unexpected modality, with better performance in the former case.'

[21] Spence, *The ICI Report on The Secrets of the Senses*, (ICI, 2003)

assault' whereby our perceptual system runs the risk of becoming overloaded and jaded. Further, he argues, this assault on our senses is predominantly a visual one: "Sensory deprivation is an ailment of modern society. While our visual senses overdose on information, the emotional sense of touch and smell are neglected."[22]

3 - Modernity, Technology and Visuality

Spence's claim, that we live in a world that is somehow too visual is a familiar one. The move to a visual culture as a definition of the sociological conditions of Modernity is one that has been well documented. Such an example might be McLuhan's arguments in *Understanding Media; The Extensions of Man* that the modern separation of the senses, as explained by Spence in psychophysical terms, is technologically determined:

> Each form of transport [of information] not only carries, but translates and transforms, the sender, receiver, and the message. The use of any kind of medium or extension of man alters the patterns of interdependence among people, as it alters the ratios among our senses.[23]

For Mcluhan Modernity and rationality were orientated around the same axis, that of visuality. This is because it was this optical turn which ensured the primacy of objectivity and rationality:

> It is this uniform, connected *and visual* order that we still use as the norm of "rational" living. In our electric age of instant and non-visual forms of interrelation, therefore, we find ourselves at a loss to define the "rational", if only because we never noticed whence it came in the first place.[24]

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[22] Spence, *The ICI Report on The Secrets of the Senses*, (ICI, 2003) pg. 7
[23] McLuhan, *Understanding Media: The Extensions of Man*, (Routledge and Kegan Paul, 1964) pg. 99
[24] ibid. pg. 129. Emphasis added.

That said, overall Mcluhan was an optimist, rather like Spence, and suggests that the hegemony of the visual might be broken by the potentials of new technologies. He was positive in his outlook in so far as he felt confident in predicting a return, within the *Global Village* to the oral and aural cultures of some pre-modern, pre-lapsarian state of integrated sensory life facilitated by new technologies[25]

Benjamin on the other hand, provided a considerably more pessimistic prognosis of humanity in the visual world of Modernity. Susan Buck-Morss has convincingly argued that Benjamin advanced the thesis in 'The Artwork in the Age of Mechanical Reproduction' that Modernity is defined by, "the crisis in cognitive experience caused by the alienation of the senses that make it possible for humanity to view its own destruction with enjoyment."[26] This enjoyment was enabled in the form of Fascism which, Benjamin argued, functioned through the bringing of aesthetics into the arena of politics. For Benjamin, like Marx before him and Debord and Baudrillard in his wake, modernity was defined as being phantasmagoric; as an image of reality, a spectacle or simulacra that somehow masked and perverted the basic and material order of things. As Buck-Morss explained of the word phantasmagoria (in relation to the visual turn within modernity):

> It describes an appearance of reality that tricks the senses through technological manipulation. And as new technologies multiplied in the nineteenth century, so did the potential for phantasmagoric effects. [In footnote] Technology thus develops with a double function. On the one hand, it extends the human senses, increasing the acuity of perception, and forces the universe to open itself up to penetration by the

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[25] See McLuhan & Fiore, *War and Peace in the Global Village*, (1968), (Hardwired, 1997)

[26] Susan Buck-Morss, 'Aesthetics and Anaesthetics: Walter Benjamin's Artwork Essay Reconsidered,' *October*, 62, (Fall, 1992) pg. 3-43

> human sensory apparatus. On the other hand, precisely because this technological extension leaves the senses open to exposure, technology doubles back on the senses as protection in the form of illusion, taking over the role of the ego in order to provide defensive insulation.[27]

4 - Art History and Modernity

This is the point at which the spiral of this discussion loops back upon itself to the starting point of Art History. What has been argued up to this point is that our experience is not explicable in terms of separate senses but rather it needs to be acknowledged that all sensory experience forms part of an interconnected experiential continuum. It has been suggested that even within the field of Perceptual Psychology, as Bertleson has observed that "most research on perception considers one modality at a time," to the detriment of a more holistic understanding of the continuum of experience. It has also been demonstrated that we are capable of cognitively and conceptually separating our senses but that in doing so we run the risk of over-prioritising one sense at the expense of others or a more full account of experience.

It was then suggested that Modernity might be defined as the over-prioritisation of sight. The prioritisation of the visual therefore provides a set of common criteria seen to be shared between Art History and Modernity[28] which would benefit from further elucidation with specific reference paid to Art History's History in relation to visuality. With this in mind what follows in the discussion below is the investigation of the suggestion that when we, as art historians, focus our attentions upon the

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[27] Ibid. pg. 22

[28] For other ways of defining this intersection see Mansfield (ed.), *Art History and its Institutions: Foundations of a Discipline*, (Routledge, 2002) especially Mansfield, 'Art History and Modernism.'

sense of sight alone then other senses, which also constitute the totality of experience, fade into the background of our understanding.

Riegl made an explicit connection between modernity and visuality in terms of the balance between optic and tactile (haptic) conceptions of space. In *The Late Roman Art Industry* he identified the history of art as a slow shift toward a modern perceptual and conceptual sensibility. And such a sensibility was one in which there was an optical understanding of space as a rational and abstract concept. This was seen in contrast to a tactile conception of space and objects within that space as discreet and touchable, almost to be experienced emotionally rather than rationally, as was demonstrated in his examples of Egyptian and Early Roman art. Thus it was that the art of the Late Romans served, for Riegl, as a transition period on the way to this modern, optic sensibility:

> The third period of antiquity deserves our special interest. Not only was the classic attempt to erect a mechanistic system of causality between individual phenomena no longer valued, but one went so far as to bring externally, individual shapes in reciprocal isolation from each other. In no way did this mean a return to primitive disconnectedness. Instead, a mechanistic theory of connection between individual shapes no longer seemed satisfactory ... A correspondence of this process with the isolation of individual shapes on the visual plane is obvious in contemporary art... the change in the late antique conception of the world was a necessary transition made by the human mind in order to take it from the concept of a purely mechanistic and sequential relationship of things (as if they were projected on a plane) to one of a general chemical connection, including, as it were, space in all directions.[29]

Note here the self-conscious reference connection to artistic practice contemporary to his own historical practice which therefore invites the comparison between Modernism in Art *and* Art History. Hauser also drew

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[29] Riegl, *Late Roman Art Industry*, trans. Winkes, (Bretschneider,1985), pg. 232-33

a connection between the act of the historian of art and contemporary art practice in terms of a modern sense of a visual turn when he argued that Wölfflin's method would have been inconceivable without Impressionism. So, just as Impressionism attempted to reduce the act of painting to the replication of the visual sense so too, it was argued, Wolfflin's method attempt at historical objectivity was to ground an art history in the 5 pairs of formal, visual analysis.[30]

After Riegl Bahktin and Medvedev, in 1928, drew a parallel between the claims for autonomy by and on behalf of Modernist art and the genesis of Art History. But they went further by suggesting that the structural form of Formalist Art History itself was related to a broader definition of Modernism. They argued that Art History, as a separate and self-contained academic discipline, should be understood in terms congruous with a formalist analysis of the work of art based on the separate and self-contained visual qualities of the work. They thus argued that a common ground could be attributed to the emergence and development of formalism as a guiding principle in both the artistic production of contemporary art *and* attempts to produce systematic accounts of the history of art which arose around the turn of the century. Bahktin and Medvedev argue that this emergence could itself be understood in terms of 'Modernity'. And more specifically that this

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30 'Wölfflin's categories of the baroque are, in fact, nothing but the application of the concepts of Impressionism to the art of seventeenth century - that is to say, to a part of this art, for the clarity of the concept of the baroque is obtained even by him at the price of mostly neglecting to consider the classicism of the seventeenth century.' Hauser notes that Wölfflin's conception of the Baroque is the move from a 'tactile' to a 'visual' sense of pictorial order (which he refers to as the 'subjectivisation of the artistic world view') which not only identifies Wölfflin's own position as pre-empted by Impressionism in the 19th century but also neglects the pre-emption of the Baroque by the Renaissance and Mannerism. Hauser, *The Social History of Art, vol. 2*, (Routledge, 1999), pg. 160

modernity involved a turn to the visual in terms of a formalist understanding of vision and visuality: "It was not what was seen that was new, but the forms of seeing themselves,"[31] they observed.

In a move that paid acknowledgement to both Wölfflin's Art History Without Names (which was identified as a slogan behind 'The completely proper demand for an objective history of the arts and the history of artistic works'[32]) and Reigl's attempts to recover 'artistic volition' [Kunstwollen] through the formal structure of a work, this Modernist mode of vision, as articulated in the systems of Modern Art History was identified as being characterised by:

> Increased interest in and sharpening of sensitivity to all concrete expressions of world view, whether expressed in paints, spatial forms, or sounds. In short, interest was focused on the forms of concrete seeing and apprehending the things of the world, not on the forms of thinking about them.[33]

What was termed as "the general ideological horizon of West European Formalism," was seen to be one delineated by, in broader cultural terms, as a particular sensory balance in favour of vision. Thus, within the context of my argument, Modernism in both Art *and Art History* was identified by Bahktin and Medvedev in terms of formalism, and further, this formalism lead to a bias toward the visual over and above other ways of conceptualising experience. The act of seeing was thus made central to the European Formal Art Historical method from its conceptual foundations.

In this making central of the act of seeing it was believed that an historical

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31 Bakhtin & Medvedev, 'The Formal Method in European Art Scholarship,' in *The Formal Method in Literary Scholarship*, trans. Wehrle, (John Hopkins University Press, 1978) pg. 43
32 Bakhtin & Medvedev, 'The Formal Method in European Art Scholarship,' in *The Formal Method in Literary Scholarship*, trans. Wehrle, (John Hopkins University Press, 1978)pg. 50
33 ibid., pg. 43

critique could receive a grounding in objective reality. This was because it was based upon the 'constructive aspect' of the artwork, which is to say the formal structure of the work as expressed in visual terms (and which could be accessed via an interpretation of the phenomenological encounter with those formal qualities.)[34] This was part of a serious minded attempt to replace connoisseur-ship with the study of art as rigorous and systematic [*Kuntswisschenschaft*], with attention shifted to the 'objective' visual away from judgements based on taste:

> The problem of seeing occupies a very important place in European formalism. The work does not exist for thought, or for feelings or emotions, but *for the sight.* The concept of seeing itself underwent extensive differentiation. The perception of form, the perception of the quality of the form, became one of the most important problems of not only art scholarship, but of theoretical aesthetics and psychology. Here too the basic tendency was to assert the inseparability of significance and meaning from the sensually perceptible quality.[35]

5 - Panofsky's Visual Perspective

Much has been made of the textual nature of iconography, perhaps as a way of distancing it, as Panofksy had himself tried to do, from the visual formalism of his predecessors. However it could also be argued, as I do here, that Iconography itself is implicated in the critique of the visual which

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[34] Yet to access a work of art via its visual qualities means that we are tied (by an umbilical cord of vision) to the materiality of that work. However this does mean that we are required to experience the material object not as 'fresh' and newly created but rather in a physically degenerated state as refracted through the patina of its own history. This could well be an unavoidable condition of historical reconstruction and not one that we could ever hope to avoid without an unhelpful retreat into speculative metaphysics. However what it also means is that if our only access to the work of art is through the formal, visual qualities of that work then we will always be working at a position at which were are alienated from the material conditions of the work's physical creation. Again, this is not necessarily a problem that can ever be reconciled, yet it *is* one which means that the act of interpretation will never be fully requited.

[35] Bakhtin & Medvedev, 'The Formal Method in European Art Scholarship,' in *The Formal Method in Literary Scholarship*, trans. Wehrle, (John Hopkins University Press, 1978) pg. 49

forms the central argument of this paper. This is because it shares the heritage of Kantian epistemology as a basis for a systematic art history.

Cheetham has argued that:

> when in the1920 essay ['The Concept of Artistic Volition'] Panofsky calls for 'serious scholarship' as the hallmark of a new and rigorous art history he argues that this foundation can only be built on Kant's philosophical method.[36]

This grounding in Kantian vocabulary and method takes two forms and has one implication. Firstly the invocation of A Priori principles which feature as the building blocks of the interpretative systems of Art Historical reconstruction; and secondly the recognition of the role of the perceiving (and thus seeing) subject at the heart of this system both illustrate the influence of Kant. The implication of this is that Art Historical method shares with Kant a distrust of the purely phenomenological experience of the unity of senses; placing an emphasis instead on the role of the understanding in shaping the manifold in perception. The separation of the senses, with an emphasis subsequently placed by Art History upon sight, can be seen as the legacy of Kant within Art History in so far as Kant prioritised the rationality of human understanding over the irrationality of sensibility. This is a tendency which can be seen to be shared between Panofsky and his formalist predecessors. With the sense of sight singled out for attention by the understanding as the basis for a systematic Art Historical method Panofsky seeks to establish his rigorous method, as Wölfflin and Riegl had done before him, on the visual qualities of the work of art:

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[36] Cheetham, *Kant, Art and Art History*, (Cambridge University Press, 2001), pg. 72

> The work of art whose immanent meaning is to be perceived must also be understood, first of all, in the concrete and formal sense of its phenomenal *appearance* which contains this meaning.[37]

This is a common ground inhabited by Panofsky Wölfflin and Riegl, a Kantian legacy which, I argue, ties them all to a limited foundation for their studies - that of sight.

A second argument which can only be alluded to here concerns that put forward by both Michael Ann Holly and Keith Moxey (amongst others)[38] that Panofsky's model of Art History as a Humanistic discipline takes its cues from a visual model, namely perspective. In other words, to paraphrase Panofsky himself, that perspective is the Symbolic Form of his own art historical method. This is to say that Panofsky's method has as the diagram for its modus operandi the model of single-point linear perspective, which has at its centre the sovereign subject who, as a king of infinite space expanding beyond them, nevertheless masters that space by rationalising it. Further, this system of rationalisation is a transparent system. A visual system (perspective) is taken, therefore as a metaphor for knowledge.

6 - Seeing After Modernism

What has been presented above is the argument that if Art History is to be defined as a Modernist practice then a significant feature of this

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[37] Panofsky, 'The Concept of Artistic Volition' (1920), trans. Northcott & Snyder, *Critical Inquiry* 8, 1, (1981), pg. 31

[38] See Holly, *Past Looking*, (esp. Ch. 1), (Cornell University Press, 1996); Moxey, 'Perspective, Panofsky and the Philosophy of History,' *The Practice of Persuasion*, (Cornell University Press, 2001). See also Elkin's arguments on the potential of various forms of perspective to be used as allegories for knowledge in Elkins, *The Poetics of Perspective*, (Cornell University Press, 1994) especially chapter 1, 'Into the Maelstrom of Metaphor.'

Modernism lies in Art History being founded upon a specifically visual mode of analysis. Further this over-determination on visuality takes three forms. Firstly in the form of Formalist Art History we see critical attention diverted toward the visual qualities of the work of art; then, in the iconographic method we see critical attention diverted toward the structure of interpretative vision; and thirdly we see that Art History as a Humanistic Discipline has an allegorical model in a diagram of vision - perspective.

If it seems like a commonplace to note the connection between art, history and vision and that we need to rely on sight to provide accounts of visual art then let the following be noted. Pictures, or the visual stimulus for art historical studies, and the words that describe them are different. As Michael Baxandall has described:

> We do not explain pictures: we explain remarks about pictures - or rather we explain pictures only in so far as we have considered them under some verbal description or specification...
> Every evolved explanation of a picture includes or implies an elaborate description of that picture. The explanation of the picture then in turn becomes part of the larger description of the picture, a way of describing things about it that would be difficult to describe in another way. But though "description" and "explanation" interpenetrate each other, this should not distract us from the fact that description is the mediating object of explanation. The description consists of words and concepts in a relation with the picture, and this relation is complex and sometimes problematic...
> In fact, language is not very well equipped to offer a notation of a particular picture. It is a generalising tool.[39]

One of the things Baxandall draws attention to is something that can often be forgotten in our day to day practice. This is that art history, as the study of the visual, often takes as a given condition of its practice the

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[39] Baxandall, 'Introduction, Language and Explanation,' *Patterns of Intention*, (Yale University Press, 1985)

transparency of its operations. By doing so what can often be ignored is the fundamental paradox which lies at the very heart of art historical method - namely the incommensurability between works of art and, in the words of James Elkins, "the words that fail them."[40] There seems no clear way to navigate this rubicon which separates art and its historical account.

However what might be suggested is that an Art History that limits itself within the Modernist parameters of vision alone works within a unnecessarily blinkered perspective. And yet this is precisely how Art History continues to operate. According to the rules of one modality, that of sight. It is for this reason that it is argued that an account of art based purely on its visual qualities alone represents an especially reductive and unrealistic project and that these words in particular can provide only part of the experiential and historical explanation of an artwork.

7 - Art and Art History After Modernism

In spiralling back again to Art History for a moment the question is posed - but what about Art History after Modernism? For that is surely where we are now.

It was almost as soon as Art History had found its prototype model in Panofsky that it began to implode. We stand now on shifting sand. There is an incredulity toward the universal systems of Modernism which Art History becomes implicated in. To demonstrate this one only needs to pose the question - has art history changed over the forty years or so since the loss of faith in the modernist project? In doing so a number of answers

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[40] Elkins, *On Pictures and the Words That Fail Them*, (Cambridge University Press, 1998)

present themselves which involve the many and varied methodological twists and turns that the discipline had responded to in the latter half of the 20th Century.

The list of how Art History may have changed in response to influence from without its borders is, I am sure, familiar to all academics, regardless of what discipline within the humanities or social sciences which they study. These include amongst the usual suspects of chapter headings for anthology compilers: Psychoanalysis; Marxist and Critical Theory (post *or* late - take your pick); Anthropology; Post-structuralism and the Linguistic Turn; Feminism; Queer Theory; Museology; and so on.

But Art History, as a self-contained, autonomous and Modernist discourse, has also faced a specific threat to its method that came not from without; but from *within* its own borders.

This internal conflict concerns the means and methods of artistic production which have also taken place in the last 40 years. This is to say that Art after Modernism, by which is meant art that calls the autonomy of the monadic modernist art work into question, also calls the operations and limits of Modernist Art History into question.

The reason for this lies in the structure of the system of Art History itself. In order to function as a recognisable discipline Art History must be a history of those particular and peculiar objects that are identified (for whatever reason) as Art. And it may be that these particular objects, the art, in turn require that particular critical positions are adopted in relation to them. The implication of this line of thinking is then that Art and Art History are inextricably linked. This is what was argued in the above examples of Wölfflin and Riegl in relation to Modernist Art. If this is the

case (as is argued here) then any transformation of one will have implications in the other.

One way in which this has been interpreted is the various 'End of Art/ Art History' arguments such as those of Danto and Belting[41]. It is argued here that because Art and Art History are linked by necessity through their following of parallel evolutionary paths then it is no coincidence that just as there was (and still is) an ambiguity, confusion, scepticism, or whatever, over the possibility of Art at the end of the 20th century, so too there was an ambiguity, confusion and scepticism over the possibility of *Art History* at the end of the century. The charge therefore is presented that Art History in its Modernist form has run out of steam and this exhaustion has an historical explanation. This explanation lies in the observation that the object of its analysis, artistic practice, has itself also undergone a dramatic shift in that there has been a move in emphasis away from the single object into more complex engagements with the artistic institutions which surround and support the practice of artistic production and reception. When faced with post-modern artistic systems Art History just doesn't have the vocabularies to deal with their complexity. More specifically it is argued that with Art after Modernism a feature of this complexity is the turn *from* the visual. This is another way of saying that with artworks of which the single example being used here is *Spiral Jetty*, what it looks like *is the very least interesting thing to say about it.* However it is the visual aspects which a certain type of Art History continues to stare at.

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41 See especially Belting, *The End of Art History*, (trans. Wood), (University of Chicago Press, 1987); Belting, *The Invisible Masterpiece*, (trans. Atkins), (Reaktion Books, 2001); Danto, *After the End of Art*, (Princeton University Press, 1997)

8 - The Bad Medicine of Visual Culture Studies

In drawing this introduction to a conclusion I argue that the 'cure' for the symptoms of Art History's blindness often ends up treating the wrong organ. We should be opening up the senses rather than focusing on our eyes alone. And this brings us on to another usual suspect which did not appear in the above list alongside the other pretenders to the throne of Art History. This is Visual Culture Studies.

In 'who's afraid of visual culture' Johanna Drucker levelled the following criticism at Art History - in relation to the study of Visual Culture:

> Art history has not only *not* expanded to include it's [the history of graphic design] products in its scope of inquiry, in my experience it has locked down the borders ever more stringently under the threat that expanding research in this field seems to raise.[42]

Drucker's position is a good example of those who seek to use Visual Culture Studies to cure Art History of its melancholic modernist malaise which is manifested in a futile and atavistic searching for lost time and lost origins.[43] In an approach common to Visual Culture Studies Drucker argues that there should be a focus on objects other than art in a broader study of culture with a specific emphasis placed upon the visuality of those objects; that is the way that certain objects look.

She continued:

> Graphic design, like fine art, but perhaps more conspicuously, is as much the result of historical, economic and social forces as it is of

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[42] Drucker, 'Who's Afraid of Visual Culture,' *Art Journal*, 4, vol. 58, (Winter, 1999), pg. 37-47

[43] This futile (almost Proustian) search for lost origins in these times after modernism has been mused over most eloquently by Keith Moxey in 'Panofsky's Melancholia,' in *The Practice of Theory*, (Cornell University Press, 1994) and Michael Ann Holly, 'Mourning and Method,' *The Art Bulletin*, 4, vol. 84, (Dec. 2002), pg. 660-669.

> aesthetic choice. In so far as the visual forms of graphic design inscribe ideological values and cultural attitudes in the very specific modes of their constitution, finish, treatment and other features of visual rhetoric, they are potent indices of the social conditions in which they are produced.[44]

Taken to its logical conclusion this study of cultural objects and cultural practices in terms of them being seen spells the end for Modernist Art History. Art become those objects which have a particular symbolic function within visual systems of signification of which art is just a part. This thereby negates the need for a history of just art. The implication of this is that these visual systems become the focus for an expanded discursive field with a broader scope encapsulating all the visual. Thus there may be other objects (those which are distinct from art) which may also have a significatory function and which may thus be also looked at and read as cultural symptoms.

As Susan Buck-Morss prophesied:

> The production of a discourse of visual culture entails the liquidation of art as we have know it. There is no way within such as discourse for art to sustain a separate existence, not as a practice, not as a phenomenon, not as an experience, not as a discipline.[45]

By arguing that their own methodological shift reflects the more general epistemological shift to visuality in society the advocates of the study of the visual aspects of culture have an initially convincing case.

It is often noted that we are surrounded by images in society. As Stuart Hall and Jessica Evans observed in their introduction to *Visual Culture: The Reader*, "the mechanically determined or electronically

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[44] Drucker, 'Who's Afraid of Visual Culture,' *Art Journal*, 4, vol. 58, (Winter, 1999), pg. 37-47

[45] Susan Buck-Morss, response to, 'Visual Culture Questionnaire,' *October*, 77, (Summer, 1996)

reproduced image is the semantic and technical unit of the modern mass media and at the heart of post-war popular culture."[46] And it is therefore a persuasive argument that suggests that we need to reflect this in our academic praxis.

WJT Mitchell put it slightly differently and said that in critical practices there has been a 'pictorial turn' as well as a linguistic turn. He has written of the:

> Realisation that spectatorship (the look, the gaze, the practices of observation, surveillance, visual pleasure) may be as deep a problem as various forms of reading (decipherment, decoding, interpretation, etc.) and that visual experience may not be fully explicable on the model of textuality [and hence]... One way of thinking of visual culture, then, is in terms of particular and historically specific combinations of meanings and subjects - scopic regimes - whose histories remain to be written.[47]

Visual Culture Studies is therefore often presented as a cure to Art History's limited vision by providing one way in which the study of art can accurately reflect the *pictorial turn* to which Mitchell refers. This is not by moving attention away from seeing alone, but as a way of expanding the scope of that vision. It thus expands the Modernist discourse of Art History to draw the objects of its analysis from a broader study of culture. In doing so the study of visual culture deprives art of its privileged status as focus for critical attention hence making it seem attractive to those who had raised complaints about what Art History did and how it did it (the name of Boudieu springs immediately to mind.)

By flattening the field Visual Culture Studies suggests that we can use the same vocabularies to talk about a Pokemon card as a Picasso

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[46] Evans & Hall, 'What is Visual Culture?,' Evans & Hall (eds.), *Visual Culture: The Reader*, (Sage, 1999) pg. 1-7
[47] Mitchell, 'The Pictorial Turn,' in *Picture Theory*, (University of Chicago Press, 1994)

painting; in other that the history of Art is replaced with a history of images, a history of things seen, or in the words of Christopher Wood :

> *Visual studies* has become shorthand for the idea that images, buildings, and design ought to be handled by the same discipline, and the idea that the distinction between high and low art is specious. "Visuality", meanwhile is shorthand for the idea that vision is an active, interpretative process strongly governed by communities and institutions, rather than an innocent openness to natural stimuli.[48]

Further, just as Visual Culture Studies has no object of study as such (in so far as it's not looking at art per se, but potentially anything) it is an ambiguous discipline. Given this ambiguity it is perfectly suited to the current academic climate namely one in which the concern for truth in relation to a knowable human subject is rejected with fashionable incredulity. In the absence of a specific object of study Visual Culture Studies has some claim to interdisciplinarity. It does so by working between the gaps between subject matters (such as television studies, film studies, design history, history of the decorative arts and so forth) and also *over* these gaps too.

However in concerning itself with the way things are looked at, by being a history of images/ or a history of things seen one charge which may be made against Visual Culture Studies. This is that it has no object upon which to critically reflect. As Crow says; "But they perpetuate the… narrowness entailed by Modernism's fetish of Visuality."[49]

This is problematic in that it restricts the analysis of the ideology implicit when things are set apart and defined as being art and are

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[48] Wood response to, 'Visual Culture Questionnaire,' *October*, 77, (Summer, 1996)
[49] Crow response to, 'Visual Culture Questionnaire,' *October*, 77, (Summer, 1996)

subsequently studied in those terms. The study of the purely visual skips the problems inherent in calling some things art, and other things not and in doing so avoids a discussion of the power dynamics implicit in such differentiation.

But more importantly to the arguments of both this introductory chapter but also the thesis as a whole is something which as been mentioned already. This is that when it comes to providing historical and critical accounts of art after Modernism the way that things look is often the very least interesting thing to say about it. In this respect any study which limits itself to the visual alone doesn't provide any panacea for Art History. And herein lies a certain irony. Visual Culture Studies takes the fundamental problem which has lain at the very heart of Art History since its Modernist foundations - the over-prioritisation of the visual – and, in an attempt to cure its symptoms merely extends the scope of this problem more widely than Art History ever did.

Yet the major problem facing Art History isn't that it didn't look hard enough but that it saw too much. This is another way of saying that the most fundamental problem facing Art History today might be not that it limits itself to sight alone, but that it doesn't 'see' enough. In doing so it runs the risk of being left behind forms of art which have moved *beyond* such Modernist preoccupations with the merely visual into institutional critiques, critiques of originality, critiques of the monadic artwork and so on.

We may be in an age that gives more emphasis to the visual but do we live in a more visual age after all? In 'Showing Seeing: a Critique of

Visual Culture'[50] WTJ Mitchell discusses the well rehearsed question of whether we've moved into a more 'visual' age or not. In such discussions often it seems that the fundamental point is missed. It is not a question of whether we are more or less visual now, and as Mitchell points out there are many historical examples of the invocation of the 'pictorial turn' as an epistemological strategy (Mitchell cites the historically diverse examples of Pliny, Plato, Lessing and Wittgenstein who all discussed the interconnection between thought and sight demonstrating that 'The pictorial or visual turn, then, is not unique to our time.'[51]) It is rather that if we choose to engage in a critique of culture which takes visuality as its prime modus-operandi then we will place certain limits on our discursive practice and hence what we can and can't say. Of course many may argue that this is a trade-off worth taking. However I would still like to leave open the question as to whilst we may gain certain insights, what are we loosing? As Foster has suggested it may be more than we gain from this expanded field of research:

> *The Image* is to visual studies what *the text* was to post-structuralist criticism: an analytical tool that has revealed the cultural artefact in new ways, especially regarding the psychological positionings of different viewers, but sometimes to the neglect of historical formation. For often in visual studies that develops out of film theory and media studies, the image is treated as a projection - in the psychological register of the imaginary, in the technical register of the simulacral, or both - as a doubly immaterial fantasm. Moreover, where once critics were slow to concede the importance of the image in our political economy, perhaps today they are too quick to grant it a dominance that it does not possess.[52]

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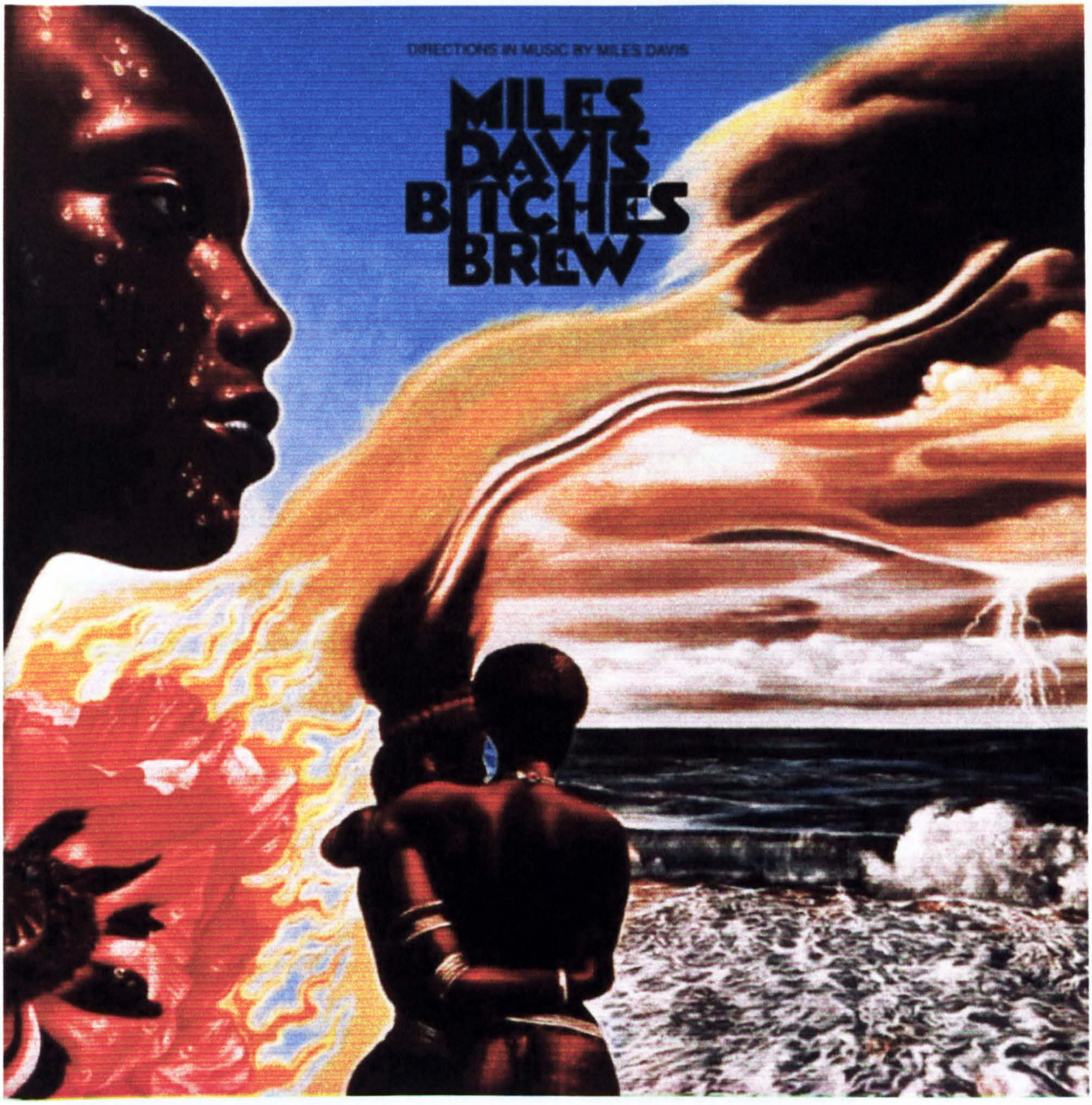
50 in eds. Holly & Moxey, *Art History, Aesthetics, Visual Studies*, (Yale University Press, 2002)

51 WTJ Mitchell, 'Showing Seeing: a Critique of Visual Culture, in eds. Holly & Moxey, *Art History, Aesthetics, Visual Studies*, (Yale University Press, 2002)

52 Foster, 'Antinomies in Art History,' *Design and Crime and Other Diatribes*, (Verso, 2002), pg. 93



Mati Klarwein: *Bitches Brew* (cover art), (1970)

In this attempt to construct more effective and convincing 'historical formations' let us instead seek to avoid the 'unconscious optics' that scared Benjamin so much by re-integrating sight into a more complete cognitive *and* phenomenological encounter with the art object. What does it smell, taste, sound and feel like; and is this different from when it was created? If so why; and how? But also what does it do, how does it do it and most importantly why? Asking these questions is important because in doing so a more complete and satisfactory account of how artworks function within social systems can be approached in empirical, historical and political terms. In the following thesis I hope to suggest that the systems-theoretical approach to Art History is an interpretive strategy which allows for the questioning and answering of works of art and their social and discursive supports in such an expanded heuristic field.

9 - Seeing Bitches Brew

I have in my hands a copy of another work of art from 1970; the same year that *Spiral Jetty* was completed. It's the record *Bitches Brew* by Miles Davis - an often terrifying collision of loose jams in which funk rhythms, rock aesthetics, jazz experimentation and the potentials of electronic recording equipment are all somehow stitched together through the multiple personalities of Miles Davis (directions in music) and Teo Macero (the producer). I'm looking at it thinking of the best way to describe it.

One can feel the smoothness and gently yielding stiffness of the glossy cardboard cover and feel the rustle of the paper sleeves inside. Inside there is the records themselves and by running your fingers over the grooves you can feel the contours of the sound contained within. It makes

me think that if my fingers were sensitive enough I might be able to 'feel' for the sounds; like musical Braille. It smells too - the slightly fusty smell you get in old record shops and second hand books shops. This object is older than me.

How would we describe this record from the point of view of Visual Culture Studies?

As a visual object it's actually quite an impressive object. The cover, by Mati Klarwein, is a histrionic blend of afro-eroticism and pseudo-spiritualism. An Art Historian might scoff at the naff-ness of such images: a flaming flower, a lightning storm, a dark masked magus with a large 'afro' hairstyle, an intertwined black and white hand. Yet the image *might* reveal something of its historical context, of contemporary social attitudes to ethnicity (in 1970 Davis was arrested again for his colour) social change and spirituality. But is that all there is to say?

There are two records inside the sleeve with a spiral scratch on each side – four sessions of music edited from the days of jamming laid down by Davis and the group and edited by Teo Macero. You can see the grooves spiralling to the centres. You can actually see the fossilised music. I wonder if there's any way of re-constructing the music from the appearance alone. Is there a possibility that, given sufficiently sensitive equipment, one could 'read' the grooves and map this into sound just as one would a musical score? Even if one could it is clear that just looking at *Bitches Brew* isn't enough. You're going to need to play the records and hear them. And even then this isn't the whole story.

And from one spiral let us move back finally to the origin of the twist and turns of this chapter; the Spiral Scratch on the landscape of Northern Utah. With *Spiral Jetty* like *Bitches Brew* and every other work of art the way that they look is not necessarily the most significant thing to say about them. In order to fully engage in the complexity of such systems we need to engage all our senses in order to provide more complete historical, political and ethical accounts of Art and its Histories. Mere vision alone will not allow this.

10 - Art Historical Synaesthesia

It may be that Art History must rely primarily upon vision as a starting point. And this is not necessarily a bad thing as Art History was founded upon a Modernist balance of the senses in favour of vision and will retain its rhetorical force by not deviating too much from its conceptual foundations as a rigorous and serious discipline. But in preserving this heritage let us also not limit ourselves unnecessarily by instead expanding the field of interpretive possibilities.

In conclusion I would like to suggest that what we need now is an art historical synaesthesia. Such a synaesthesia could extend the phenomenological experience of art beyond the boundaries of the vision of Art History's limited perspective. This is *not* a call to give up thought in place of aesthetics but is instead an attempt to emphasise that the historical conditions of art after modernism will not be recognised by an historical method which remains limited by its own specifically Modernist perspectives. For when it comes to finding the 'sense' of works of art,

especially complex ones like *Spiral Jetty*, one sense, it seems, is never enough. Systems-Theory, I argue, can allow Art History to observe this.

CHAPTER ONE:

WHAT IS SYSTEMS THEORY?

Introduction

In the chapters following this one I will apply the concept of system and the methodology of the systems-thinking approach to Art History. However, before this application, in this chapter I introduce the reader to two central definitions. These are:

(i) What is a system?

(ii) What is Systems Theory?

The term *System* is very common in contemporary society; and even someone who has no familiarity with the specific debates of the systems-theoretical approach will have encountered some of the popular usage of the definitions and vocabularies that I outline below. This is because systems proliferate in all aspects of contemporary society. Systems are all around us. We use them every day in the form of, for example: air conditioning systems; computer operating systems; health care systems and so forth. The term 'system' is widely applied and might also be used to describe social phenomena as diverse as: housing systems; clothing systems; bedding systems; driving systems and so on. The growth of the phenomena of systems has had noticeable implications for the employment market. For example, *The Bureau of Labor Statistics* (U.S. Department of Labor) gives the following statistical analysis of workers considered to be

Systems Analysts:

> As computer applications expand, systems analysts, computer scientists, and database administrators are projected to be among the fastest growing occupations. Systems analysts, computers scientists, and database administrators are expected to be among the fastest growing occupations [corresponding to an increase of 36 percent or more] through 2010. Systems analysts, computer

scientists, and database administrators held about 887,000 jobs in 2000, including about 71,000 who were self-employed... Employment was distributed among the following detailed occupations:
Computer system analysts: 431,000
Network systems and data communications analysts: 119,000
Database administrators: 106,000
Computer and information scientists, research: 28,000
All other computer specialists: 203,00[53]

1 - What is a System?

1.1 Defining a System

Systems can be defined in various ways depending upon how they are being used and who is using them. For example within the discourse of Communications Theory a system is defined in terms of the flows of information.[54] Systems can be analysed in terms of their structural organisation, as a biologist studying organic systems might. [55] Systems have been identified by those working within disciplines as diverse as: physics, biology, chemistry, engineering, economics, sociology and so forth. It has also been used within theories and strategies of management[56]. As will be discussed in further detail below, it is a strength of Systems Theory that it can accommodate such wide-ranging interests within the vocabularies of a

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[53] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2002-03 Edition*, Systems Analysts, Computer Scientists, and Database Administrators, on the Internet at **http://www.bls.gov/oco/ocos042.htm** (consulted November 25, 2003).
[54] The classic formulation of Information Theory was presented by Claude Shannon in 1948 at Bell Labs.. The text of his original paper is expanded upon in: Shannon & Weaver, *The Mathematical Theory of Communication*, (Univ of Illinois, 1963 [1998])
[55] The classic work on the application of a systems-theoretical approach to Biology is by Gregory Bateson, most notably in Bateson, *Steps to an Ecology of Mind*, (Ballantine, 1972)
[56] This is exemplified by the work of the *Complexity Research Programme* at the London School of Economics which is a interdisciplinary research and teaching initiative. Further details are found at the *Complexity Research Programme Website*: **http://www.psych.lse.ac.uk:16080/complexity/index.html** (consulted 29,11,2003). The application of the systems-theoretical approach to town planning and social management received a thorough articulation in Chadwick, *A Systems View of Planning*, (Pergamon, 1971)

unified discourse. This is because it looks for systems in a diversity of observed phenomena.

Broadly speaking a system is a set of elements integrated with one another to such an extent that they form a recognisable and coherent whole. In addition, this recognisable and coherent whole performs some type of recognisable function. Thus, in general a system is a collection of components that by virtue of its organisation and function, becomes *meaningful*[57] in its own right.

As Boulding observed: "The broadest possible definition of a system is that it is anything that is not chaos. We could turn the pattern around and define a system as any structure that exhibits order and pattern."[58]

However, a mere aggregation of arbitrary elements on its own does not constitute a system. It needs to be a collection of the right type of parts in the right type of order. For example a drawer full of socks is not a system. It is, instead, merely an aggregate of its parts and will not display the requisite systemic behaviour. In order for a collection of components to be considered a system the following three criteria need to be present:

1 - There must be some kind of meaningful order to their arrangement. In other words they need to be organised in a meaningful way.

2 – The order of this organisation must enable the performance of an identifiable function.

3 - The individual components of the system need to be able to perform functions which contribute to the systemic operations of the whole system.

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[57] A system is identified as meaningful in so far as it has a recognisable structure and that structure contributes to the functioning of the whole.
[58] Boulding, K.E., *The World as a Total System.*, (Sage, 1985), pg. 9

For example a collection of neurons meaningfully ordered in a system of a neural network is able to perform functions that none of the single neurons can perform; (on the contrary there is nothing that a drawer of socks can do - no matter how sophisticated the ordering of the socks – that a single pair of socks cannot do. This is because the socks on their own, and as part of a collection of socks, cannot perform autonomous functions; and the drawer on its own cannot function autonomously either.)

For a collection of components to be called a system (either simple, complicated or complex) the elements must be organised in a systemic way. This is to say that not only the system's function be considered but also that the organisation of its elements plays an equally significant role in identifying and defining whether a collection can be called a system. The identification of systemic organisation requires that the elements are interconnected in such a way that the functions of the individual parts will have an effect on the functioning of the whole system. Likewise the functioning of the system will affect the functions of elements within the system. Within the sock drawer the socks do not function in a manner related to the drawer of socks; instead their 'sock-ness' is autonomous from their location in either the drawer or on the foot of the owner. Likewise the drawer does not function according to the socks contained within it and would function no differently if it contained other items of clothing such as tee-shirts.[59]

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[59] von Bertalanffy has defined this in the following terms: "In dealing with complexes of 'elements,' three different kinds of distinction may be made – i.e., 1. according to their *number*; 2. according to their *species*; 3. according to the *relations* of elements." von Bertalanffy, *General Systems Theory*, (Braziller, 1968) whereby in the example of the sock-drawer: *number* corresponds to the amount of socks;

Ludwig von Bertalanffy, who is widely seen as the originator of the systems-thinking approach[60] gave the following, more technical, definition of how a system can be defined:

> A system can be defined as a complex of interacting elements. Interaction means that elements, p, stand in relations, R, so that the behaviour of an element p in R is different from its behaviour in another relation R′. If the behaviours in R and R′ are not different, there is no interaction, and the elements behave independently with respect to the relations R and R′[61]

Further, von Bertalanffy stated that a system might also be defined mathematically as a series of simultaneous differential equations. In doing so a set of mathematical criteria is provided for modelling the system. The set of conditions of the system's operation and how this will change over time can therefore be qualified as is demonstrated, by von Bertalanffy in the following sequence of differential equations[62]:

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species refers to the items of clothing (in this case socks); and *relations* refers to the organisation of the socks in the drawer.

[60] Often called the 'founding father,' of *Systems Theory* von Bertalanffy established the systems-theoretical approach in 1968 with the publication of *General Systems Theory*, (Braziller, 1968); as a developmental biologist he argued that the systems-theoretical approach could use the biological metaphors of adaptation and evolution to explain a wide variety of 'isomorphic' systems and their behaviour.

[61] von Bertalanffy, *General Systems Theory*, (Braziller, 1968) pg. 55

[62] "For illustration, we choose a system of simultaneous differential equations. Denoting some measure of elements, P_i ($i = 1,2,\ldots n$), by Q_i, these, for a finite number of elements and in the simplest form will be of the form [of the equation given above]. Change to any measure Q_i therefore is a function of all Qs from Q_i to Q_n; conversely, change of any Q_i entails change of all other measures and of the system as a whole." Von Bertalanffy, *General Systems Theory*, (George Braziller, 1968) pg. 56

$$\frac{dQ_1}{dt} = f_1(Q_1, Q_2, \ldots Q_n)$$

$$\frac{dQ_2}{dt} = f_2(Q_1, Q_2, \ldots Q_n)$$

.....

$$\frac{dQ_n}{dt} = f_n(Q_1, Q_2, \ldots Q_n)$$

Another definition of System has been provided by Angyal. Like von Bertalanffy he is another figure of historical significance for the birth of systems-thinking as a separate discipline.[63] From within a sociological perspective Angyal applied the concept of systems to the behaviour of humans in their environments. He claimed that the:

> Structure of wholes is perhaps amenable to logical treatment after all, that, though it may not be described in terms of relations, it may be described in terms of some more adequate logical unit, representing an entirely different logical genus. Here the attempt will be made to demonstrate that there is a logical genus suitable to the treatment of wholes. We propose to call it a system.[64]

Angyal's conception of 'system' as an entity of structural organisation which is conceptually distinct from its component parts raises another key aspect of systems in general, of central importance to my arguments in the thesis, that that they are understood not only as combination of component parts but also as a combination of component parts *that can only be understood in terms of its entirety.* In other words the system

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[63]Angyal was another key figure in providing clear definitions of 'system' for the nascent discipline. His scientific definitions of 'system' are outlined in: Angyal, *Logic of Systems*, (1969, Penguin). As a psychologist and psychotherapist Angyal discussed the epistemological implications of Systems-Thinking with particular reference to the human subject as an extension of his earlier work which focused on the relationship between the psychic system (Luhmann) and its environment. See Angyal, *Foundations for a Science of Personality*, (Harvard University Press, 1941).

[64] Angyal, *Foundations for a Science of Personality*, (Harvard University Press, 1941), pg. 243 ff.

cannot be accounted for by considering merely the sum of the individual elements. Instead, because the organisation and function in the system as a whole is crucial for their operation, a holistic approach is required.

1.2 Identifying a System

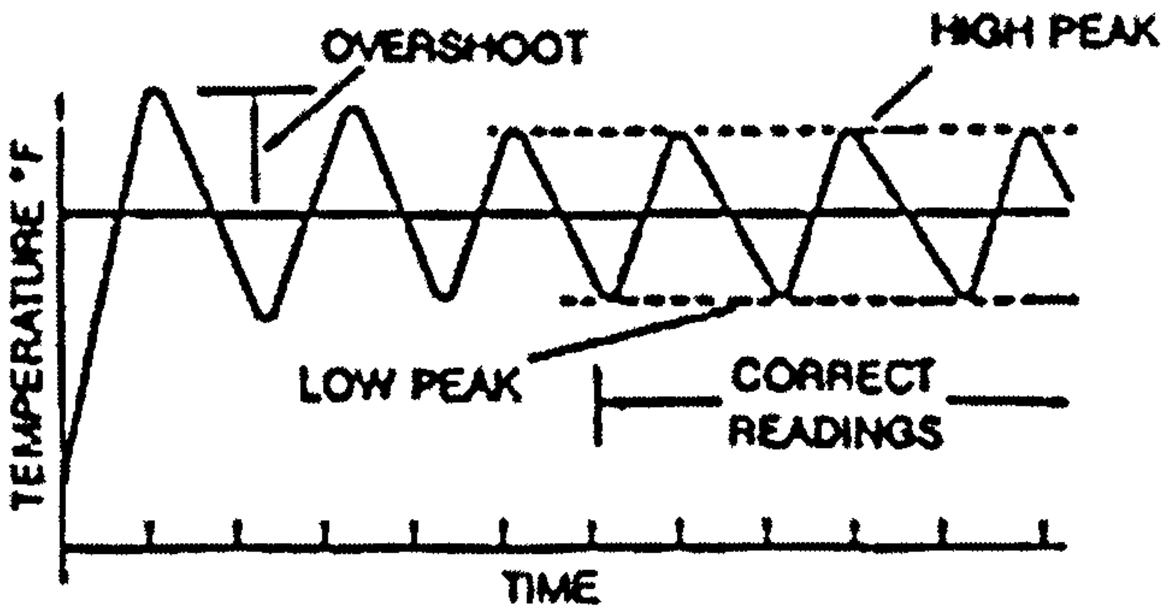
A system, in order to be identified as such, must have coherence and must be recognisable in its own right. This sense of the individual identity of a system is related to its function in so far as the system's identity is constituted by its performing a recognisable function (or variety of functions) over time. It is by virtue of its function (or functions) that the system acquires and maintains both a clear identity and distinguishable boundaries. It can thus be differentiated both from its environment and other systems. Further, through the use of function(s) as the criteria for identity rather than structure, the system can retain its recognisable and distinct identity over time even though its structure may have adapted and evolved. For example a synapse within a neural network cannot be identified as a system because it cannot be functionally differentiated from its environment of the network within which it functions. The neural network itself, on the other hand, can be identified as a system because it has its own coherent and differentiated identity in so far as it will be seen to perform the same recognisable function over time even as its structure evolves. It can also be differentiated from other neural networks that function in different spatio-temporal conditions.

Further a system (or sub-system) might be identifiable in its own right but still be functionally subordinate to a larger systems. This would happen in the case of sub-systems which operate within larger systems.

Such subordination need not compromise the identity of the sub-system which could still be identified as a system in its own right. This would be possible providing that the system meets the criteria given above of demonstrating a recognisable function over time. An example of this would be the human subject – itself a complex system yet one which circulates within and is hence subordinate to larger social systems.

1.3 Linear and non-linear systems

Providing a set of qualifying mathematical criteria, as von Bertalanffy does, is necessary if the system is to be modelled conceptually rather than physically. This is of particular significance when the system is to be modelled by computer a virtual system (and given the complexity of many systems this is the only way of modelling them.) By using such a conceptual of model the nature of the system can articulated in terms of the types of differential equations which are required for its modelling. For example a simple system such as an environment whose temperature is regulated using a thermostat (which uses negative feedback to regulate temperature of a system within set parameters) can be mathematically modelled using several linear differential equations which give the following graph.



Initial Overshoot and Amplitude After Stabilization

Image of the operations of a thermostat from the *American Appliance* website[65]

The differential equations will be linear because such as system will behave in a predictable way. In other words it can be plotted on a graph using a straight line. This means that given an input into the system a predictable output will be generated and that this output will be of the same value every time that input is used. Further, given the predictability of the system a specific output can be predicted for *any* possible input introduced into this simple, linear system.

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[65] **http://www.american appliance.com/service_pages/general_tips/range_adjustment.htm** (visited 29/11/03)

A complex, or non-linear system, on the other hand, behaves differently, and it is these complex or non-linear systems that form the basis of the examples used throughout this thesis. Systems this type are unlike linear systems because there are unpredictability aspects to their behaviour and they do not display the quality of simple predictability that we find in linear systems. Complexity refers to the fact that systems will not always behave in the same way given the same input. Stated simply this non-linearity means that the behaviour (or output) of the system cannot be plotted on a graph by using a straight line. If such a system is to be modelled (and often the complexity of the system means that it cannot be modelled in its entirety) then the differential equations used in the modelling will also be non-linear. Coveney and Highfield have given some examples of what complex and non-linear systems are like:

> In general, non-linearity produces complex and frequently unexpected results. Irreversibility and nonlinearity characterise phenomena in every field of science: the complexity of the markings on a butterfly's wings, a leopard's spots, the shape of a spleenwort fern, the whorls of a little green alga called the Mermaid's cap, and the rhythms in living systems such as the palpitations of a heart, the firing of nerve cells within the brain, and so on. Related but more subtle, chaotic forms of complexity also arise from non-linearity, including apparently random weather patterns, the outbreak of flu epidemics, and the spread of information and ideas.[66]

2 - What is Systems Theory?

Generally speaking Systems-Theory is the study of systems. It is an umbrella term that includes a wide variety of studies. However the arguments in my thesis are concerned primarily with study and theory of *complex* systems. The closest historical precedent for the study of complex,

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[66] Coveney & Highfield, Frontiers of Complexity, (Faber and Faber, 1995), pg. 9-10

non-linear systems as it is understood today is found in the study of Cybernetics. The term 'Cybernetics' was coined in 1948 when Norbert Weiner, a professor of mathematics at MIT, published his book called *Cybernetics*. Weiner defined his term in the following manner:

> "We have decided to call the entire field of control and communication theory, whether in the machine or in the animal, by the name Cybernetics, which we form from the Greek [kybernos] or steersman."[67]

In inventing *Cybernetics* Weiner was a pioneer of the systems-theoretical approach. However he did not consider himself to be on originator of a new way of thinking but instead traced his thought back to the Industrial Revolution. The emergence of the industrial world in the 19th century brought with it, he argued, systemic modes of thought. He identified the analysis of systems emerging from the creation of systems of industrial production and the subsequent need for ways of accounting for them. According to Weiner the first paper of note to be published on feedback mechanisms within industrial systems was published by Clerk Maxwell in 1868[68]. Further, Weiner argued, the modern world as the product of the industrial revolution was comprised not only of industrial systems but also of other social systems that emerged at the same. Such social systems included class systems marked by the emergence of the bourgeoisie as the dominant political force in the western world; national systems marked by the emergence of the nation state; political systems created to reflect these new class and national systems; transport systems marked by the emergence of railway networks; communication systems evidenced by the

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[67] Norbert Weiner, 'Cybernetics [or control and communication in the animal or machine]', (John Wiley & Sons, 1948)
[68] Weiner, *Cybernetics*, (The Technology Press, 1948), Pg. 19

appearance of newspapers and the telegraph and other forms of mass media; and so forth.

Weiner's project in the establishment of Cybernetics was to identify a vocabulary through which a general theory of scientific, social *and systemic* phenomena could be articulated. He therefore sought a language by which to describe the:

> Essential unity of the set of problems centring about communication, control and statistical mechanics, whether in the machine or in living tissue.[69]

2.1 Systems-Thinking and Interdisciplinarity

The 'essential unity' to which Weiner referred demonstrates his intention to identify a shared vocabulary by which to talk about different systems and thus provide common conceptual and mathematical models to be applied across disciplines. This call for interdisciplinarity represents another key feature of a systems-theoretical approach. It was later taken by Ludwig von Bertalanffy, the father of modern systems theory, as the defining feature of what he was to name in 1968 – a *General Systems Theory.* As is discussed in further detail below in his 'General Systems Theory' von Bertalanffy attempted a project similar to that of Weiner; namely the identification of what he called isomorphisms, or structural similarities, shared by different systems.

Like the study of Cybernetics the General Systems Theory of von Bertalanffy is interested in different organisations of systems as well as questions about their functions and outputs. Equally it is also concerned with identifying systems; that is in distinguishing systems both from their

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[69] ibid

environment and from other structures that are not systems. This process of differentiation entails the observation of phenomena in terms of systemic input, output and behaviour, and then the subsequent evaluation as to whether systems are present. Areas of research where the Systems-Thinking approach has been meaningfully applied and systemic behaviour identified include - meteorology, economics, neuro-science, biology, chemistry, physics, sociology and anthropology. It is my intention in the following chapters to add Art History to this ever growing list of applications

2.2 How Does General Systems Theory work? - The Operations of Systems Theory

Regardless of its application in the various areas of study there is a unifying feature of the systems-theoretical approach. This is that clearly there can be no systems-theory without a concept of system. In 1968, in *General Systems Theory* Ludwig von Bertalannfy recognised the need for such a plural concept in the systems-theoretical approach and stated that it should operate according to the central concept of 'System.' He wrote:

> Thus, there exist models, principles, and laws that apply to generalized systems or their subclasses, Irrespective of their particular kind, the nature of their component elements, and the relations or "forces" between them. It seems legitimate to ask for a theory, not of systems of a more or less special kind, but of a universal principles applying to systems in general... In this way we postulate a new discipline called General System Theory. Its subject matter is the formulation and derivation of those principles which are valid for systems in general...A consequence of the existence of general system properties is the appearance of structural similarities or isomorphism in different fields. There are correspondences in the principles that govern the behaviour of entities that are, intrinsically different.[70]

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[70] von Bertalannfy, General System Theory, (Braziller, 1968) pg.32

Broadly speaking *General Systems Theory* operates through the analyses of three types of systems. These are:

1 –Natural Systems. Those systems said to occur naturally. These include such systems as an ant colony, a weather system or a cognitive system such as the brain.

2 –Artificial Systems. These are non-natural systems such as economic markets, or models of artificial intelligence which are, in the broadest sense the product of human activity.

3 –Epistemological systems. These are systems of knowledge by which the world is represented. Whilst these are closely related to artificial systems (in so far as epistemological systems are not naturally occurring) they are included here as a separate order of systems because they are discursive systems of conceptual self-reflection. Systems theory itself is such an epistemological system. And as I argue in the following chapters, so too is Art History.

Von Bertalanffy developed *General Systems Theory* as a way to order the many apparently differing yet what he identified as 'isomorphic' (structurally similar) practices that he had observed in diverse scientific fields. In reflecting back on his own historical legacy just four years later (in 1972) he again asserted the centrality of the principle of 'System' in a General System Theory as a way of organizing what he had observed. Von Bertalannfy wrote:

> This trend [of organization in complex systems] arising in biology and other disciplines led me to conceive the idea of a general Systems Theory, that is, an interdisciplinary doctrine "elaborating

> principles and models that apply to systems in general, irrespective of their particular kind, elements and forces involved."[71]

Evidence of Dynamical Systems Theory 'locking in' around the concept of system proliferates the discourse. As Ackoff observed in 1960:

> The term 'system' is used to cover a wide range of phenomena. We speak, for example, of philosophical systems, number systems, communication systems, control systems, educational systems and weapon systems. Some of these are conceptual constructs and others are physical entities. Initially we can define a system broadly and crudely as any entity, conceptual or physical, which consists of interdependent parts.[72]

Lazlo, another pioneer of the systems-theoretical approach wrote in 1972 that:

> I only suggest that such general systems theories grasp some forms of order in the world which elude other types of theories. Thus general systems theories are one species of "world hypothesis"; they find their use and justification in the elucidation of otherwise chaotic patterns of events in the natural world. That currently general systems theories represent the most intensely worked field of general theory is not accidental: the systems concepts used in this theory permit a more adequate interpretation of a greater range of phenomena in a more consistent and unitary manner than any other[73]

More recently Kevin Kelly argued in *Out of Control*, (1994) (his survey of complex systems and what he subtitles 'the new biology of machines, social systems and the Economic world',) for a wider application of the systems –theoretical approach to a variety of analyses:

> The overlap of the mechanical and the lifelike increases year by year... I call these examples [of complex and auto-catalytic systems from ant colonies, to economies to robot intelligence], both made and born, "vivisystems" for the lifelikeness each kind of system holds.... The vivisystems I examine in this book are nearly

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[71] von Bertalannfy, foreword to, Lazlo, *Introduction to Systems Philosophy*, (Gordon and Breach, 1972) pg.xvii

[72] Ackoff, 'Systems, organizations and interdisciplinary research', General Systems Yearbook, vol. 5, 1960 (Society for General Systems Research) pg. 3

[73] Lazlo, *Introduction to Systems Philosophy*, (Gordon and Breach, 1972) pg. 15

> bottomless complications, vast in range, and gigantic in nuance. From these particular big systems I have appropriated unifying principles for all large vivisystems; I call them the laws of god, and they are the fundamentals shared by all self-sustaining, self-improving systems.[74]

What follows below is a general introduction to some more specific vocabularies of systems theory which will be subsequently applied to Art History within the course of the thesis – in particular in the second part of my thesis.

3 Some key vocabularies of the Systems-Theoretical Approach

3.1 - Dynamical Systems Theory[75]

Systems come in all shapes and sizes; in different types and multiple forms. And likewise the studies of systems also comes in different forms. For example the broad term 'Systems-Thinking' includes Cybernetics, General Systems Theory, Chaos Theory, Complexity Theory and so forth. Given the diversity of concerns, disciplines and practitioners involved there is often a lack of clarity in the application and use of specific vocabularies. This lack of clarity is demonstrated by the example of Chaos Theory which whilst very fashionable during the 1980s consequently fell out of favour in the 1990s and was replaced by the discourse of Complexity Theory. The

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[74] Kelly, Out of Control, (Perseus Books, 1994)

[75] The term Dynamical Systems comes from the group, The Dynamical Systems Collective which was established in the 1970's at the University of California, Santa Cruz to study the nascent discipline of Chaos Theory. The group was formed by Norman Packard and Doyne Farmer who famously tried to discover a system by which to beat the casino tables in Las Vegas. Further anecdotal evidence of this can be found in Bass, *The Predictors: How a Band of Maverick Physicists Set Out to Beat Wall Street*, (Penguin, 2001). The key paper by the members of the collective is Crutchfield, Farmer, Packard, Shaw, 'Chaos', *Scientific American*, 255 (December, 1986), pg. 46-57 in which they discuss chaotic dynamics in the operation of both computers and in intervals between drops of water dripping unpredictably from a tap.

terms 'chaos' and 'complexity' often carry an ambiguity with regards to what theories exactly they are meant to invoke. As Chris Langton (a central figure in 'Chaos Theory') has observed: "Chaos and Complexity are chasing each other around in a circle trying to find out if they are the same or different."[76] These ambiguities are exacerbated because systems-thinking is still a relatively young discipline that constantly makes new advancements. For this reason it has not yet had time to clarify its terms and methods or effect a consensus amongst practitioners. So, for example, in the discussions on emergent properties reference is made to Emergentism[77] Emergence, Emergent Properties and Synergetics[78] in reference to the same observations about the emergence of phenomena from collective patterns of systemic behaviour.

In my own discussion in this thesis I am concerned with those particular types of systems known as *Dynamic* Systems. Dynamic systems are those systems which demonstrate dynamic patterns of behaviour which is to say that they are systems that change over time. Such dynamic patterns include behaviour such as self-organisation, emergence, complexity and unpredictability (as outlined below.) For this reason I will use the term *Dynamical Systems Theory*, that is the study of dynamical systems, to refer collectively to the various theories which I draw from in my arguments concerning the application of the systems-theoretical approach to Art History.

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[76] Chris Langton in conversation quoted in Lewin, *Complexity: Life on the Edge of Chaos*, (Phoenix, 1993) pg. 10

[77] See Roy, Petitot, Pachoud, Varela, 'Beyond the Gap: An introduction to Naturalizing Phenomenology,' in Roy, Petitot, Pachoud, Varela, *Naturalizing Phenomenology*, (Stanford University Press, 1999), pg. 1-82

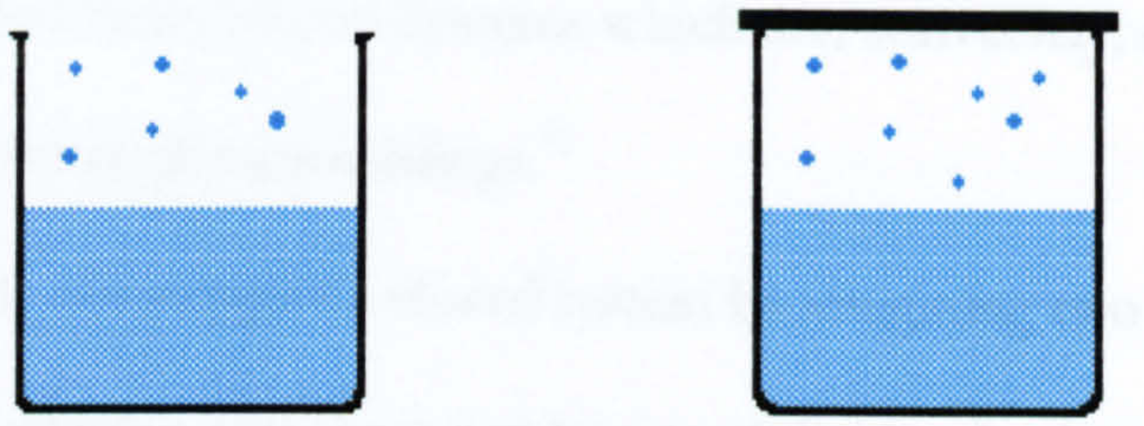
[78] Haken, *Synergetics: An Introduction: Nonequilibrium Phase Transitions and Self-Organization in Physics, Chemistry, and Biology* (Springer, 1978)

Open And Closed Systems

- *Open system* - exchanges material with surroundings.
- *Closed systems* - no exchange: can reach equilibrium;

#molecules/s returning to liquid = # escaping to vapour

liquid ⇌ vapour



Open system Closed system

Lecture 9.1

Image of Closed and Open systems from:
http://www.chem.usyd.edu.au/~mjtj/CHEM1101/CHEM1101.lectures/1101.lecture9/sld001.htm (Consulted Dec. 2003)

3.2 - Closed and Open Systems

A key characteristic of Dynamic systems is that they are Open systems. Open systems are dynamic and change over time because they are open to influence from their immediate environment. Open systems are differentiated from Closed Systems which are, conversely, operationally separate from their surroundings.[79]

One can imagine a closed system by imagining two glass jars; on top of one another and separated by a card divider. In the top jar is black smoke (which is heavier than air), and in the bottom jar is fresh air. The contents of the two jars are separated from one another by the divider and from the external environment by the walls of the jars; it is thus a closed system. If the separating divider is removed the smoke will diffuse into the air of the lower glass. After a period of time both jars will be full of an even mixture of smoke and air. At this point the system will have reached a point of equilibrium, which is to say that at this point the air and smoke cannot mix any further and thus the closed system ceases to evolve. In contrast an open system will continue to receive information from its immediate environment and in doing so it will adapt its operations and form accordingly.

The difference between closed and open systems is a central focus of attention for two of the most important studies of Systems-Theory: von

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[79] The significance of open systems to a systems-theoretical approach was identified as early as 1950 in von Bertalanffy's paper, 'The Theory of Open Systems in Physics and Biology.' In this paper von Bertalanffy identified that organisms could be discussed in terms of being open systems in so far as they interacted with their immediate environments by, ‚maintaining themselves inexchange of materials with environment, and in contiuous building up and breaking down of their components.' Von Bertalanffy, 'The Theory of Open Systems in Physics and Biology,' *Science*, vol.111, (1950), pg. 23-29

Bertanlanffy's *General System Theory* and Prigogine and Stengers' study of complexity, *Order out of Chaos*[80] In *Order out of Chaos* it is argued that when dynamical systems reach a certain level of complexity they display self-organising (autopoietic.[81]) behaviour. This principle of self-organisation is a key characteristic of complex systems. It expresses how complexity emerges from systems which are open to influence from their environment(s).

Open systems interact with their environment in two ways. They can receive information from outside their boundaries which subsequently has an effect upon the internal organisation of the system. And they can transmit information to their environment too. Neither process of input or output occurs in the smoke filled jars of the above example.

The distinction between closed and open systems is often invoked by the system-theoretical approach as a means to demonstrate the limits of classical physics, as exemplified by the Second Law of Thermodynamics,[82] in dealing with the emergent dynamics of complex systems. As von Bertalannfy noted, classic physics looks at closed systems which do not interact with their environment. These include models as small as an atom

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[80] Prigogine & Stengers, *Order Out of Chaos: Man's New Dialogue with Nature*, (Bantam, 1984)

[81] Autopoiesis is "the process whereby an organization produces itself. An autopoietic organization is an autonomous and self-maintaining unity which contains component-producing processes. The components, through their interaction, generate recursively the same network of processes which produced them. An autopoietic system is operationally closed and structurally state determined with no apparent inputs and outputs. A cell, an organism, and perhaps a corporation are examples of autopoietic systems." From the *Web Dictionary of Cybernetics and Systems*, (ed. Heylighten), on the website of the *Principia Cybernetica Project* (PCP): see **http://pespmc1.vub.ac.be/Default.html**, (visited 29,11,2003)

[82] The Second Law of Thermodynamics is part of the study of Dynamics. Dynamics is a branch of mechanics which concerns itself with the study (and mathematical modelling) of the behaviour and action of physical bodies when acted upon by physical forces. It also studies the changes in motion produced thereof by such forces.

or as large as a solar system. The benefit of dealing with these entities as closed systems is that their behaviour can be successfully predicted. This is because if the all the conditions of the system and the way in which that system will perform are known it can be modelled as if it were isolated from its environment.

Prigogine has provided the following mathematical definition of the Second Law of Thermodynamics as formulated by Rudolf Clausius with Lord Kelvin some time around 1820[83]:

$$\overline{\frac{dS}{dt}} \geq 0$$

Simply speaking it states that within a closed physical system the disorder or entropy of that system will increase over time until an equilibrium is reached and the systems is in the state of maximum entropy.[84]

As a further development of this theme Von Bertalanffy, extrapolated by providing a conceptual congruence between the concept of entropy and the concept of information. In these terms information is defined accordingly, as (in Sayre's terms): "decrease in uncertainty, or more directly as an increase in probability."[85]

In his use of the concept of information Von Bertalanffy appeals to the concepts of order and the lack of order (or disorder) as a means of describing the state of a system at any one time. A disordered system is one

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[83] Prigogine, 'Thermodynamics of Evolution.' *Physics Today*, (November, 1972) pg. 23-28; & (December, 1972) pg. 34-44

[84] To clarify; the equation states that within a closed system the [instantaneous] rate of change [the differential or d] of entropy [or S] with respect to time is positive. In other words over a period of time a closed system will move towards a state of increased entropy and this will continue without change until a state of thermodynamic equilibrium [or maximum value of S] is reached.

[85] Sayre, *Cybernetics and the Philosophy of Mind*, (Routledge and Kegan Paul, 1976), pg.

which demonstrates minimal organisational information; and likewise an ordered system manifests the information of the systems structural organisation.

Thus the Second Law of thermodynamics can be restated using the concept of information. In doing so it will be stated thus: that within a closed system the quantity of entropy (or disorder) will increase until a state of equilibrium is reached; and at this stage the system will contain minimal information. In this formulation a closed system will lose organizational information over time and become increasingly entropic.

An order of entropy can be expressed mathematically as a logarithm of probability because, it is argued, the entropic state is the most probable state for a closed system to be in. In the example of a closed system given above it is highly unlikely that the smoke and air will remain separated of the dividers are removed and the system is left to its own devices. In this case The system 'wants' (if you will) to become entropic. This 'will to disorder' means that the system is predisposed to distribute the elements (in this case the smoke) equally. This means that the eventual mixture of black and white smoke is the most probable state for the system to be in. Likewise when the system which is highly structured according to organisational information, by being separated into smoke and air, it is in a less probable state. On probability and structural organisation Bertalanffy has stated:

> But entropy, as we have already heard, is a measure of disorder; hence negative entropy or information is a measure of order or of organization since the latter, compared to the distribution at random, is an improbable state.[86]

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[86] Von Bertalanffy, *General System Theory*, (George Braziller, 1968) pg. 30-53

The Second Law of Thermodynamics has proved highly effective in describing how closed systems behave. However not all systems are closed systems. The limitations the law become evident when one uses it to model observable events which occur within open and dynamic systems. Von Bertalanffy has stated:

> Conventional Physics deals only with closed systems, i.e., systems which are considered to be isolated from their environment. Thus physical chemistry tells us about the reactions, their rates, and the chemical equilibria eventually established in a closed vessel where a number of reactants are brought together. Thermodynamics expressly declares that its laws apply only to closed systems. In particular, the second principle of thermodynamics states that in a closed system, a certain quantity called entropy must increase to a maximum and eventually the process comes to stop at a state of equilibrium. [The second principle can be formulated in different ways, one being that entropy is a measure of probability, and so a closed system tends to a state of most probable distribution... So the tendency towards maximum entropy or the most probable distribution is the tendency to maximum disorder.] However, we find systems which by their very nature and definition are not closed systems. Every living organism is essentially an open system. It maintains itself in a continuous inflow and outflow, a building up and breaking down of components, never being, so long as it is alive, in a state of chemical and thermodynamic equilibrium but maintained in a so-called steady state which is distinct from the latter. This is the very essence of that fundamental phenomenon of life which is called metabolism, the chemical process within living cells. What now? Obviously, the conventional formulations of physics are, in principle, inapplicable to the living organism qua open system and steady state, and may well suspect that many characteristics of living systems which are paradoxical in view of the laws of physics are a consequence of this fact."[87]

A theory of dynamic systems as is practiced by the systems-theoretical approach concerns itself with open systems. In doing so it can be used to identify a limit to the vocabulary of so-called 'classic' physics which fails to accommodate the behaviour of open systems. This failure lies in an inability to account for that fact that open systems receive neg-

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[87] Von Bertalanffy, *General System Theory*, (George Braziller, 1968) pg. 30-53

entropy (negative entropy or information) from outside their internal functions. Since neg-entropy effects the internal functioning of these systems they cannot be sufficiently explained according to internal effects alone. The input of external information affects the degree of internal organisation. The system therefore displays less entropy and becomes more ordered and thus it appears that the process towards increasingly probable entropic states suggested by the second law is reversed. Such systems display, for example, evolutionary behaviour (by which a system adapts to its environment), which can be empirically observed but which contradict the world-view of the second Law of Thermodynamics.

In anticipation of the arguments advanced below a similarity is identified between the methods and limits of 'classic' physics described above (and exemplified by the Second Law of Thermodynamics) and an account of art which deals with it as a closed system. Such a view is exemplified by Formalist art criticism. Thus when Greenberg famously insisted that; "The purely plastic or abstract qualities of the art are the only ones that count"[88] he was not only ignoring the institutional systems that served to support the modernist art at the centre of his analysis but was also effectively undermining his own project by failing to acknowledge the function of his own writing in providing regulatory feedback on the growth of American abstract art. Thus for the same reason that the Second Law of Thermodynamics is flawed (namely that it deals with closed systems) so too a formalist analysis of a work of art is limited because it treats the object as a closed system of representation that is not engaged in processes of

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[88] Greenberg, 'Towards a Newer Laocoon' in *Art in Theory 1900-1990*, ed. Harrison and Wood (Blackwell, 1992)

feedback with the supporting institutional and critical systems by which it is supported and within which it exists. In this thesis I propose to overcome these limitations by means of a systems-theoretical approach that sees the work of art as an open system of representation that itself constitutes a subsystem of the art world which in turn interacts with larger historical, social, philosophical, political and economic systems.

3.3 The *whole* is greater than the sum of the parts

It was argued above that Complexity within systems means that the behaviour of dynamic systems cannot be understood in terms of either the functioning of the elements of the system on their own or the system as isolated from its environment. Further it was argued that a complex system is an organisation of functioning elements with an identity that is recognisable in relation to both those functions and that organisation. This means that in the act of both identifying a complex system and the subsequent analysis of the behaviour of that system the system needs to be considered in its entirety .In other words the whole of the system is a more significant object of critical analysis than its individual components. Further the whole of the system is a different entity than the mere sum of the parts of the system. And the system as a distinct entity can be distinguished from its environment.

Von Bertalanffy locates this move to a holistic approach within the systems-theoretical method in relation to a broader epistemological shift away from a method based upon atomism. Von Bertalanffy associates such an atomistic approach with positivism within science and more specifically the approach of his own academic heritage. He wrote:

> Having been educated in the philosophical tradition later called the Vienna Circle, I may perhaps hint at the change that has taken place [with regards to the methodolgical shift of a systems approach]. The epistemology (and metaphysics) of logical positivism was determined by the ideas of physicalism and reductionism, and the 'camera theory' of knowledge. These in the view of present day knowledge, are quite simply obsolete... Compared to the analytical procedure of classical science, with linear causality connecting two variables as a basic category, the investigation of organised wholes of many variables requires new categories of interaction, transaction, teleology, etc. with many problems arising in epistemology, mathematical models and techniques.[89]

Two of the most significant implications of the holist approach are:

1 – that the system needs to be understood in terms of both its parts and the structure of those parts because everything in a complex system is interconnected.[90]

2 – complex systems operate as a whole; this means that the behaviour, inputs and outputs of such systems are *distributed* over those systems.

Kevin Kelly has described the concept of holism in the systems-theoretical approach in terms similar to that of von Bertalanffy whilst also describing its interdisciplinary application:

> The spirit of a beehive, the behaviour of an economy, the thinking of a supercomputer, and the life in me are distributed over a multitude of smaller units (which themselves may be distributed). When the sum of the parts can add up to more than the parts, then that extra being (that something from nothing) is distributed among the parts. Whenever we find something from nothing, we find it arising from a field of many interacting smaller pieces. All the mysteries we find most interesting – life, intelligence, evolution – are found in the soil of large distributed systems.[91]

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[89] von Bertalanffy, ‚foreword', in Laszlo, *Introduction to Systems Philosophy*, (Gordon and Breach, 1972), pg. Xix. A parallel can arguably be drawn between the Vienna Circle to which von Bertalanffy alludes and a particular configuration of scientific art history (also connected with Vienna in the early 20th Century) which, I argue, requires a reconsideration of its aims and methods.

[90] The form of this interconnection takes the form of processes of feedback and distribution as a discussed in more detail throughout the thesis.

[91] Kelly, *Out of Control*, (Perseus Books, 1994) pg. 469

The ramifications of the above are discussed in greater length throughout the thesis. In anticipation of these discussions, however, I propose that a holistic critical approach (as opposed to the atomistic viewpoint) which is a key characteristic of systems-thinking approach has two significant implications when applied to the discipline of Art History. These reflect the two implications of the holist approach in general (as given above). They are:

1 - In its application within social sciences the holism of the systems-theoretical approach necessitates a move from a sociology based on the individual human subject to one based upon the systemic structures from out of which those human subjects emerge as was most famously practiced in Luhmann's sociology based upon his analysis of 'Social Systems.'[92]

2 - In a study of art in terms of systems this attention to the whole system means a shift in attention away from individual works of art onto the structures and systems within which those incidents of art occur. In my thesis I identify these as the systems of (amongst others): the art gallery; the art market; art discourse; and the artwork itself as a complex (non-monadic) system.

3.4 Emergence

The concept of the whole of the system being a more significant conceptual entity than can also be understood in terms of emergence.

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[92] Luhmann's method forms the basis of my own discussions concerning the function of art, the artist and art history within such social systems. See especially, Luhmann, *Social Systems*, (trans. Bednarz,), (Stanford University Press, 1995) although I do not take up his specific concept of the work of art understood in terms of intersubjective communication as is specifically discussed in: Luhmann, *Art as a Social Systems*, (trans. Knodt), (Stanford University Press, 2000)

Emergence occurs when there is sufficient complexity in a system for additional properties or behaviours to emerge from the system. These are often called 'global' properties of the system as Heylighten has observed:

> *Emergence* is a classical concept in systems theory, where it denotes the principle that the global properties defining higher order systems or 'wholes' (e.g. boundaries, organisation, control, ...) can in general not be reduced to the properties of the lower order subsystems or 'parts'. Such irreducible properties are called emergent. Until now there is no satisfactory theory explaining what characterizes emergent properties or what are the conditions for their existence.[93]

The concept of Emergence in complex systems has been applied to the self-organisation which is observable in many complex systems (such as, for example the system of an ant colony as is discussed in a following chapter.) Such self-organisation, which I argue is also observable in the systems of Art, is an emergent property of complex systems. Emergence has thus been used to explain a wide variety of behaviour observable in complex systems. One of its most significant applications can be found within neuroscience and the discourse of Artificial Intelligence/Life. Here consciousness is understood as an emergent property of a complex cognitive system.[94] As Coveney and Highfield have observed:

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[93] Heylighen, 'Self-Organization, Emergence and the Architecture of Complexity', *Proceedings of the 1st European Conference on System Science*, (AFCET, 1989) pg. 23-32.

[94] The literature on this area is both huge and rapidly expanding. An early philosophical study concerning a systems-thinking application to the mind/body debate in materialist terms is found in Sayre, *Cybernetics and the Philosophy of Mind*, (Routledge and Kegan Paul, 1976) however arguably Sayre's arguments were not testable without the sophisticated computer technology which has emerged from the late 1980s onwards. More recent and excellent overviews of the major current philosophical debates are found in: Horgan & Tienson (eds.), *Connectionism and the Philosophy of Mind*, (Kluwer Academic Publishers, 1991); Ramsey, Stich, & Rumelhart (eds.,), *Philosophy and Connectionist Theory*, (Lawrence Erlbaum Associates, 1991); Boden (ed.), *The Philosophy of Artificial Life*, (Oxford University Press, 1996); Boden (ed.), *The Philosophy of Artificial Intelligence*, (Oxford University Press, 1990)

Life is also an emergent property, one that arises when physiochemical systems are organized and interact in certain ways. Similarly a human being is an emergent property of huge numbers of cells, a company is more than the sum of its pens, papers, real estate, and personnel, while a city is an emergent property of thousands pr millions of human beings. And no one should doubt that out innermost thoughts, our emotions of love and hate, are more than a rush of individual hormones, or the firing of individual neurons in the brain. The study of complexity, through its emphasis on emergent properties, goes some way to restoring a balance between the spiritual and materialistic sides of our nature.[95]

In the arguments of this thesis I argue that the very concept of Art is itself an emergent property of the complex systems to which it is associated. These include the systems of the art gallery, the art market, art discourse and the complex networks of artworks themselves.

3.5 Complexity

Complexity is the most important concept of the types of systems which I discuss in this thesis. It is also, however, the most difficult to define precisely. As Cilliers has noted: "The concept remains elusive at both the qualitative and quantitative levels."[96] Likewise Coveney and Highfield have also written about the difficulty in defining the concept:

"This word is often used in an infuriatingly vague sense by scientists, who may mean different things by it."[97] Likewise Heylighten has given the following commentary on the difficulty in providing a specific definition of *Complexity*:

> Still, I believe there is a common, 'objective' core in the different concepts of complexity. Let us go back to the original Latin word complexus, which signifies 'entwined', 'twisted together'. This may be interpreted in the following way: in order to have a complex you

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95 Coveney & Highfield, *Frontiers of Complexity*, (Ballantine Books, 1995) pg. 330-31
96 Cilliers, *Complexity and Postmodernity*, (Routledge, 1998), pg. 2
97 Coveney & Highfield, *Frontiers of Complexity*, (Faber & Faber, 1995) pg. 14

need two or more components, which are joined in such a way that it is difficult to separate them. Similarly, the Oxford Dictionary defines something as 'complex' if it is 'made of (usually several) closely connected parts'. Here we find the basic duality between parts which are at the same time distinct and connected. Intuitively then, a system would be more complex if more parts could be distinguished, and if more connections between them existed. More parts to be represented means more extensive models, which require more time to be searched or computed. Since the components of a complex cannot be separated without destroying it, the method of analysis or decomposition into independent modules cannot be used to develop or simplify such models. This implies that complex entities will be difficult to model, that eventual models will be difficult to use for prediction or control, and that problems will be difficult to solve. This accounts for the connotation of difficult, which the word 'complex' has received in later periods.[98]

From within a Systems-Thinking perspective when it is said that systems are complex something quite specific is being said.

Firstly it means that the systems are more often than not. This means that they receive organising information from outside their boundaries which increases the order within the system.

Secondly *Complexity* does not just mean that a system is very big, nor even does it mean that it is complicated. Instead complexity refers to the way in which the system functions in a dynamic manner. Complexity emerges from dynamic as opposed to simple systems. This means that the way in which a complex system functions is not explained through an explanation of how every bit of the system works; instead something of the system as a functioning whole is required. As Cilliers observed: "there is neither something at the level below (a source) nor at a level above (a meta-

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[98] Heylighten, 'What is complexity?,' (Dec 9, 1996,) published on the *Principia Cybernetica Web*, website: **http://pespmc1.vub.ac.be/COMPLEXI.html**, (consulted 29/11/03)

description), capable of capturing the essence of complexity."[99] Further a complete description of a complex system must be as complex as the system that it is describing. This is because if the description is more simple than what it is describing then the complexity will have been mis-represented.

Nonetheless the following characteristics of complex systems can be identified in relation to the following concepts:

1 – Complex (as opposed to complicated); 2 –Dynamic; 3 –

Interconnected; 4 – A whole (as opposed to a aggregate of its parts); 5 –

Non-linear; 6 - The balance between connection and differentiation.

I will now discuss each of these concepts in turn.

3.5.1 – Complex not Complicated

In identifying a system as complex it is differentiated from a system which is merely complicated. To call something complicated means that it can be recognised as being composed of many different parts. These parts could be organised in simple manner but be complicated by virtue of the sheer number of parts involved. An example of this would be an imaginary jigsaw puzzle of 100, 000 pieces. The puzzle is complicated because of all its many parts. And it would require this complication to be negotiated in order for the puzzle to be completed. However despite this numerical complication the way in which a jigsaw works is, in actuality, very simple. It is not complex. Likewise an organisation could be made of many parts and be structured in a complicated way but still not be complex because it does not function in a complex way. As Cilliers has observed:

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[99]Cilliers, *Complexity and Postmodernity*, (Routledge, 1998), pg. 3

"I have heard it said (by someone from France, of course) that a jumbo jet is complicated, but that a mayonnaise is complex."[100]

3.5.2 - Dynamic

Complexity emerges from dynamic systems. There are three aspects of a system which allow it to function dynamically; and hence in a complex manner. These are:

1 - the type of elements within a system. They must be those which will interact with one another in different ways. This means that each element is capable of behaving in different ways depending upon the other elements that it is interacting with and the mode of that interaction. In short each part of a dynamic system must be flexible enough to work with other parts of the system in creating the dynamic whole that is a complex system.

2- the way in which those elements are organised. The elements of a complex system must be organised in such a way so as to allow for a dynamic interaction between the (adaptable) elements.

3- the manner in which the elements interact with one another. Self-evidently, in order to be complex a system must actualise its potential for dynamic interaction. That is it must display complex behaviour.

3.5.3 Interconnected

One of the reasons that certain systems are dynamic and complex is because of the high level of interaction amongst the component parts. For example a complex system such as a neural network operates dynamically by virtue of a high level of interconnection between the component parts.

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[100] Cilliers, *Complexity and Postmodernity*, (Routledge, 1998), pg. 3

This serves to illustrate that what makes an arrangement dynamic (and hence complex) is the different ways in which the components of a system can interact. Within a Jumbo Jet there is a specific way in which the parts can interact. This interaction is set within the parameters of the Jumbo Jet's function and there is little potential allowed for deviation from this function. For example the tyres of the plane have a specific function and cannot interact with the air-conditioning system. And if the parts were arranged in a different order then the object wouldn't be a jumbo jet.. There are clearly a great many parts to the jet and they perform a great many functions – I couldn't build one in my garage - but this is just an expression of the complication of the jet's design rather than its complexity. A mayonnaise on the other hand is complex because whilst each element of the emulsion (egg yolk, oil, acid and salt) contributes to the overall system the mayonnaise as a whole and they are in a symbiotic (and non-linear) relationship with one another.

3.5.4 – A Complex system must be taken as whole

An understanding of a complex system must operate at the level of the system as a whole and not on an atomistic level which reduces the system to its component parts.

To be complex a system must be both numerous and diverse. As Coveney and Highfield have stated:

"The complexity of a problem is defined [in mathematical terms as] the number if mathematical operations needed to solve it."[101] Thus complex systems are similar to complicated systems in so far as both are composed

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[101] Coveney & Highfield, *Frontiers of Complexity*, (Faber & Faber, 1995) pg. 14

of a large number of component parts. However, in complex systems this numerousness creates a diverse and complex interaction between those elements. For example a collection of five ants is not complex yet an ant colony is. This is because the potential for dynamic interaction between the five ants is limited (by the number of ants) whereas the potential for dynamic and complex interaction between the ants in the colony is enormous. A small system is easy to describe by describing the individual elements and their behaviours (through differential equations for example). However in a large and complex system this description of the elements alone is not sufficient to describe and understand the way in which the system works. Thus, in order to account for a complex system, the level of description needs to be at the system as a whole.

3.5.5 - Non-linearity

If interactions between elements within a dynamic system are both diverse and non-linear then they will produce complex behaviour; and further they will contribute to the complexity of the system. By diverse interactions it is meant that elements within the system will interact with many other elements of the system; and do so in varied ways. For example ants in a colony can interact with one another in a variety of ways that would not be possible for the elements in a jumbo-jet to do. By non-linear it is meant that interactions need not happen in the same order for subsequent interactions. Non-linearity is a defining feature of complex systems and also allows for another key characteristic of complex systems namely

positive feedback within complex systems (as is discussed in more detail below) where small causes can have large effects[102]

The non-linearity of dynamic/complex systems has two other implications. These are:

1 - That dynamic systems are not in a state of equilibrium. They are constantly changing their state and do not remain the same over time (that is that their structure, rather than just their physical constitution, and operations adapt and evolve); hence their dynamism. As Cilliers has observed: "Complex systems operate under conditions far from equilibrium. There has to be a constant flow of energy to maintain the organisation of the system and to ensure its survival. Equilibrium is another word for death."[103]

2 - A dynamic system develops in a non-linear fashion because it has a memory. This is to say that previous operations within the system are 'remembered' by the system. The weather system 'remembers' the butterflies wings flapping when the tidal wave breaks. This argument is discussed in greater length (ref) in my discussion below on 'lock-in' and systemic memory.

3.5.6 - The balance between connection and differentiation

The emergence of Complexity depends upon two aspects of a system.

These are:

1 - connection and 2 - differentiation. These two elements need to be balanced in order for complexity to emerge. Connection means that parts

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[102] The role of Positive Feedback, as discussed by W.Brian Arthur, forms the basis of my arguments in Chapter 8 on the Gallery and Dynamical Systems Theory.
[103] Cilliers, *Complexity and Postmodernity*, (Routledge, 1998), pg. 4

of the system need to be interconnected. The greater the level of interconnection the greater the level of order within the system. This is because more information will be required to describe the system; in other words a connected system will require more data to model what goes on within the system. The connected system will thus display less entropy (or disorder) and more neg-entropy than a unconnected one. Complete connection within a system (in which *every* element is connected with every other element) leads to a completely ordered system. An example of a completely order system would be a perfect crystal in which the position of each molecule within the crystal is related to every other molecule in a completely interconnected structure. Differentiation in a system, on the other hand, means that the components of the system are distinct from one another. This means that there will be variety in the system and that different parts of the system will behave differently. Increased differentiation within a system contributes not only to the complexity of a system but also, contrary to connection, to its disorder. Complete differentiation within a system leads to complete disorder. An example of such disorder would be a gas in which the movement of the molecules within the gas in its environment are independent of one another. A system can only be complex if a balance between connection and differentiation is present. This means that a complex system is both ordered and disordered. It has a structure but also variety and capacity for change and dynamic behaviour. An increase in both connection and differentiation within a system can contribute to that system's complexity this is because with more structural variety more dynamic behaviour, for different types of operations and thus change is possible. This is not the case in a totally

connected system (such as a crystal) which is too ordered to allow the possibility of dynamic change or a totally differentiated system which will also not change because it has reached a state of maximum entropy. A complex system is therefore one balanced between order and disorder. This balance allows to system to be creative and to change over time under its own impetus (what Varela calls auto-poiesis)[104] but to do so in a way that means that it retains its own recognisable identity. This complex balance between chaos and order has lead to complexity being called *The Edge of Chaos*. Such systems on the 'Edge of Chaos' can adapt and evolve as Goodwin has argued:

> [The edge of chaos] is almost a theorem about life, the universe and everything that is complex and non-linear (which is *nearly* everything.) Speaking anthropomorphically the edge of chaos is a good place to be in a constantly changing world because from their you can always explore the patterns of order that are available and try them out for their appropriateness to the current situation... Complex systems that can evolve will always be near the edge of chaos, poised for the creative step into emergent novelty that is the essence of the evolutionary process.'[105]

3.6 Isomorphism

Isomorphism the final key concept of a systems-theoretical approach I explain here is, arguably, the most important for method; that is my own application of *Dynamcial Systems Theory* to an analysis of art and art history. This is due to that fact that because *Dynamical Systems Theory* proposes that isomorphisms (or structural similarities) are identifiable amongst diverse systems it can be legitimately applied to other discourses including the

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104 Varela, *Autopoiesis: A Theory of Living Organisation*, (North Holland, 1981)
105 Goodwin, *How the Leopard Changed its Spots*, (Weidenfield and Nicolson, 1994), pg. 175. Kaufman has also argued that the edge of chaos is a: "powerful new framework to understand evolutionary biology," which can be used to explain the evolution of biological systems. See Kauffman, *The Origins of Order*, (Oxford University Press, 1993), pg. 261

systems of art and art history. When *General Systems Theory* was originally formulated by von Bertalanffy it was as a solution to what he recognised as the failure of the increasingly isolated and specialized sciences[106] to accommodate certain phenomena. Hence the failed application of the second law of thermodynamics to open systems as outlined above. Thus the aim of his method was to identify structural similarities or *isomorphic tendencies* having currency in the gaps between isolated scientific disciplines such as biology, chemistry and physics. The goal was to find these more general principles and thus save the language of the specialist from unintelligibility, metaphysics and isolation from the world which I discussed at the beginning of the chapter.

Dynamical Systems Theory is thus characterised by an interdisciplinary method. It attempts to discuss isomorphisms between different systems and works on the basic principle that there are universal principles according to which all dynamic systems, no matter what form they take, are organised. As von Bertalanffy observed:

> Speaking in 'material' language, it means that the world, i.e. the total of observable events, shows structural uniformities, manifesting themselves by isomorphic traces of order in the different levels or realms.[107]

Thus the universal concept of the 'system' serves as the overarching conceptual framework by which a multitude of phenomena from diverse fields of study can be explained.

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[106] This can be compared with both Husserl's arguments on the 'crisis' of the sciences in the modern age (see Husserl, *The Crisis of European Sciences and Transcendental Phenomenology*, (1954), (Northwestern University Press, 1970)) and Lyotard's arguments in *The Postmodern Condition*. Both argue that the crisis in the condition of knowledge in Modernity is defined by an increasing specialisation of disciplines which facilitates their increasing autonomy and isolation.

[107] von Bertalanffy (1968) pg. 49

In the spirit of such an interdisciplinary method I attempt, in this thesis, to find and discuss further general and 'isomorphic' systems principles in the systems of Art and Art History.

4 Applications

Given the suggestiveness of the Systems-Theoretical approach it has been taken up in the name of a number of practices. Management studies for example has found the concept of 'system' as a highly useful concept in understanding corporate and management structures and the literature on 'Management Systems' and so forth is vast. Arguably the most productive recent application has been the application of systems-thinking and complexity to the questions and philosophy of Artificial Intelligence and Artificial Life[108]. In artistic practice there has been some application of 'systems' to inform artistic practice. This is most notable in the work of Jack Burnham who first invoked systems-thinking in the 1960s[109]; and Hans Haacke who has also made numerous artistic engagements with artistic 'systems.' More recently the *Biotica* project at the RCA (1999) attempted a (not entirely successful) artistic synthesis of modelling of Artificial Life and installation art[110]. To my knowledge there has been no attempt to systematically apply the systems-theoretical approach to art history in the English language (in book length form at least.)[111] However I identify two precedents for my arguments and method below.

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108 I discuss some of the implications of this in chapter 7

109 see – **http://www.volweb.cz/horvitz/burnham/homepage.htm** - for a full online bibliography of Burnham's work – work in reference here.

110 See Brown, *Biotica: Art Emergence and Artificial Life*, (RCA, 2001)

111 Notable exceptions include the ever growing English translations of Luhmann, Sevänen, E., 'Art as an Autopoietic Sub-System of Modern Society,' *Theory, Culture and Society*, vol. 18 (1)(SAGE, 2001) and the recent work of Matthew Rampley

4.1 Luhmann – Social Systems and Art as a Social System

The work of the German sociologist Niklas Luhmann is exemplary of the usefulness of the systems-theoretical approach when applied to the humanities; and it has thus been an inspiration for my own use of systems-theory within Art History[112]

Luhmann proposed to radicalise his own sociological praxis through application of systems thinking. In doing so he proposed an analysis of various social systems (which include legal systems; art systems; economic systems and so forth) in terms of them being understood in the following key terms:

1 – Systems of observation. That is systems which have function according to the phenomena which they observe. For example the economic system is a system which observes economic value.

2 – Systems of differentiation. That is systems which by virtue of their representative function perform the function of differentiation (from one another and, crucially from their environment).

(Edinburgh College of Art), WJT Mitchell, (Art Institute of Chicago) and Rakuschan, whose work, 'Art and Repugnance: Form as Anti-Form, Art as Anti-Art, Market as Anti-Market,' was published on the website of the *European Institute for Progressive Cultural Policies*, **http://www.eipcp.net/diskurs/d05/text/rakuschan_kunst_en.html** (consulted Dec. 2003). Kitty Zijlmans has made a valuable contribution to the field. See for example her 'Kunstgeschichte als Systemtheorie,' *Gesichtspunkte. Kunstgeschichte heute* (Berlin: D. Reimer Verlag, 1995) pg. 251-277.

[112] However it is also noted that I do not attempt an evaluation of Luhmann's specific approach to Art (as it is discussed in *Art as a Social* System) within my thesis. This is because, I argue, that this would only be possible after I have established my own theoretical position with regards to the application of systems-thinking to Art Historical method (something which Luhmann does not himself do.) Luhmann is therefore discussed here as one example of the application of systems-thinking to questions of cultural analysis. However a more thorough investigation of Luhmann's thought in particular (and ultimately his application to commentaries on Art and Art History) forms a significant part of my ongoing and future research.

3 – Systems of Communication. That is systems which function according to the process of communication (transfer of information as it is understood by Shannon's conception of information theory[113])

Luhmann claimed that his project should be understood as a 'rewriting [of] the theory of society' through the systems-theoretical approach. This, he argued, had the implication of a paradigm shift:

> At the structural level, from stratification to functional differentiation. The unity of society is not to be sought in ethico-political demands, but rather in the emergence of comparable conditions in systems as diverse as religion or the monetary economy, science or art, intimate relationships or politics - despite extreme differences between the functional and operational modes of these systems. Our theoretical proposition offers the following: a clear demarcation of external system boundaries of different domains and comparability between different systems.[114]

What Luhmann thus proposed was nothing less than a move, in sociological practice, away from an analysis of the structural 'stratification' of society in terms of critiques of societal organisations and hierarchies and social relationships[115] to a sociological analysis in terms continuous with the strategies of *Dynamical Systems Theory*. One of Luhmann's translators - Eva M Knodt - has elaborated on this paradigm shift in the following manner:

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[113] Luhmann's adaptation of Shannon's Information Theory to the specific issue of communication within social systems is introduced in the collection of essays: Luhmann (ed. Rasch), *Theories of Distinction*, (Stanford University Press, 2002) – see especially part III, 'What is Communication?' For Shannon's own definition of Information Theory see Shannon & Weaver, *The Mathematical Theory of Communication*, (University of Illinois Press, 1949)

[114] Luhmann, *Art as a Social System*, Trans. Knodt, (Stanford University Press, 2000) pg.2

[115] Such a method was exemplified by the earlier approach to 'systematising' Sociology practiced by Talcott Parsons, (see Parsons, *The Social System*, (Free Press, 1951) for an outline of his largely structuralist approach) which has its roots in the social structuralism of Weber and Levi-Strauss. This mode of Sociology requires the notion of society understood in terms of social structure in order to function. Luhmann's contribution was that he acknowledged that such structure was a function of, and thus relative to, his own discursive system rather than understood as an extra-discursive 'other.'

> General systems theory is the result of two subsequent paradigm shifts, which moved the problem of order from the fringes of metaphysical speculation to the centre of scientific research. In the first of these shifts, initiated by the German biophysiologist Ludwig von Bertalanffy in the mid - 1950's, the metaphysical distinction between part and whole was replaced by the distinction between system and environment... In a second shift, the system/environment distinction was redefined within a general theory of self-referential systems.[116]

Hence in Luhmann's work there is a move away from an analysis of social structures *in themselves*, which in structuralist sociology are pre-empted before they are deconstructed, to analyses of the ways in which these structures emerge from the complex matrices of communication which occur at the level of the social system.[117]

For Luhmann, the Social Systems of his analyses are not composed as rigid macro-structures which dictate behaviour from the top down by organising it and systematising it. In other words they are not a scaffolding which supports social activity or bureaucratically orders social relationships and communications. Instead Luhmann suggests that social systems are formed from the bottom up; that is that they are emergent properties of the functioning of social relations on the micro (not macro) level. Social

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[116] Knodt, 'Foreword' [to Luhmann, *Social Systems*], in Luhmann, *Social Systems*, Trans. Bednarz, Jr. with Baecker, (Stanford University Press, 1995) pg. xxi

[117] This move away from an analysis of the structure of social systems toward examinations of the functional patterns of social behaviours in terms of the dynamics of complex systems is characteristic of a more general skepticism toward structural analytical strategies demonstrated by a rejection of Modernism. This rejection of Modernism forms part of the larger debate in which Luhmann's reception is placed; not least I terms of the debate between himself and Habermas. For more on this see Rasch, *Niklas Luhmann's Modernity*, (Stanford University Press, 2000) which is especially good on the Habermas/Luhmann debate. See also Rasch & Wolfe (eds.), *Observing Complexity: Systems Theory and Postmodernity*, (University of Minnesota Press, 2000) which contains Luhmann's own paper, 'Why Does Society Describe Itself as Postmodern?' alongside commentaries on the debate. A good English introduction to Habermas' position is found in: Habermas, *The Philosophical Discourse of Modernity: 12 Lectures*, (MIT Press, 1987); Habermas, 'Modernity versus Postmodernity,' (trans. Benhabib), *New German Critique*, 22, (1981) pg.3-14 and Habermas, 'Modernity - An Incomplete Project,' in Foster (ed.), *The Anti- aesthetic*, (Bay Press, 1983) pg. 3-15

systems are, therefore, a collection of functions, or to use Luhmann's terms a collection of 'operations'. He argued:

> Operations (conscious perceptions as well as communications) are nothing more than events. They cannot persist, nor can they be altered. They emerge and vanish in the same instant, taking no more time than is needed to fulfil the function of an element that cannot be decomposed any further.[118]

4.1.1 Psychic Systems: Luhmann and the Human Subject

Luhmann conceives of individual humans within social systems in terms of what he defined as *Psychic Systems*. It is this identification of the individual in the same terms as society (i.e. as systems) that allows him to discuss operational isomorphisms shared between them. His discussions on Physic Systems identify the following key points:

1 - that consciousness is a (closed) psychic system (differentiated from its environment and other psychic systems.)

2 - that psychic systems are characterised by the operations of perceptions particular to individual psychic systems. That is that self-consciousness is a particular type of perception; that this perception is one of self-recognition/apperception and hence can be identified, in systems-theoretical terms as self-reflexive or cybernetic.

3 - psychic systems operate within larger (Social) systems

4- the operations of social systems have an influential effect on the operations of psychic systems (and vice versa)

and therefore that:

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[118] Luhmann, *Art as a Social System*, Trans. Knodt, (Stanford University Press, 2000) pg. 49

5 - perceptions within psychic systems (the operations of psychic systems) are involved in relations of feedback, exchange and control with social systems.

Hence Luhmann argued that conditions of social systems will effect the operative conditions of the psychic systems which operate within them.[119]

Luhmann further argued that within social systems interactions take place between psychic systems. However Luhmann argues that this interaction between psychic systems does not occur at the level of 'communication' within social systems but rather that it takes place in a manner different to the discreet transfer of information between minds. This is because, Luhmann argues, psychic systems are closed to both themselves and one another; they have 'operative closure' which means that they have clearly delineated boundaries within which they operate.

Luhmann argues that because of this operative closure perception itself

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[119] A particular aspect of this inter-relationship, between psychic and social systems is the ways in which the perceptions and output of psychic systems are interdependent upon the technological state of that social system. Luhmann articulated this interdependence in terms of the 'meaning' produced by the organisational information and the output of both psychic and social systems. He wrote: "Psychic and Social Systems have evolved together. At any time the one kind of system is the necessary environment of the other. This necessity is grounded in the evolution that makes these kinds of systems possible. Persons cannot emerge and continue to exist without social systems, nor can social systems without persons. This co-evolution has led to a common achievement, employed by psychic as well as social systems. Both kinds of systems are ordered according to it, and for both it is binding as the indispensable, undeniable for of their complexity and self-reference. We call this evolutionary achievement 'meaning'" Luhmann, *Social* Systems, pg. 59 And that: "Both kinds of systems emerge by the path of co-evolution. One is impossible without the other, and vice-versa. They must, so to speak, differentiate themselves in respect to meaning. Meaning is the true 'substance' of this emergent evolutionary level. It is therefore false (or, more gently, it is a falsely chosen anthropocentrism) to assign the psychic, that is, the conscious, anchorage a sort of ontological priority over the social. It is impossible to find a 'supporting substance' for meaning. Meaning supports itself in that it enables its own self-referential reproduction. And only the forms of this reproduction differentiate psychic and social structures." Luhmann, *Social* Systems, pg. 97-8

(which is the operations of a closed psychic system in terms of that system's self-recognition, or self awareness) cannot be directly communicated to another psychic system. In *Art as a Social System* Luhmann stated:

> "One thing is certain; if it is generally true that psychic operations, not to speak of those of the living system, can never be executed in another consciousness, which because of its complexity and historically self-referential mode of operation remains opaque, then this holds also for the artist distanced by his work and for his admirers as well - no more and no less, for inaccessibility does not allow for augmentation."[120]

In *Art as a Social System* Luhmann argues that art has a special function within social systems because it allows for the replication and hence communication of the perceptions and operations of these closed psychic systems between one another. However the arguments outlined a greater length in this thesis as a whole will not investigate the problematic issue of intersubjectivity between psychic systems and the nature that art may play in this, but will instead use Luhmann's arguments concerning the discursive self-reflexivity of systems-theory as a means for art history to reflect upon its operations through the adoption of a systems-theoretical approach.

4.1.2 Luhmann and Complexity

Another key aspect of Luhmann's contribution to Sociology was his use of the principle of complexity (and complex systems) as a descriptive organising principle of social systems. Thus both complexity and complex systems are used as a heuristic device in the analysis of social systems.

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[120] Luhmann, *Art as a Social System*, [trans. Knodt], (Stanford University Press, 2000) pg. 13

Luhmann engages with Complexity in two fundamental ways. These are:

1 - The particular behavioural patterns of the social systems which he described are specific to complex systems; that is they are dynamic, unpredictable, self-organising (auto-catalytic) and display emergence.

2 - As a consequence of ensuring that his own discursive system (such as that presented in the 600 pages of *Social Systems*) satisfactorily accounts for the complexity in the social systems he observed, his own textual and theoretical system is mimetic of the complexity discusses. This means that texts such as *Social Systems* are themselves complex. This is something Luhmann himself recognised at different stages in the reception of *Social Systems*. Firstly in the original preface to *Social Systems* he wrote:

> A Sociological theory that wants to consolidate the conditions of the discipline must not only be more complex, it must be much more complex that the classical authors and their interpreters - even Parsons - had thought. This requires different theoretical precautions in regard to validity and connectivity, internally as well as externally, and it requires, not least, building the reflection of complexity (and the concept of complexity) into the theory itself.[121]

And then again in 1991 in the preface to the English edition of *Social Systems* he wrote:

> This is not an easy book. It does not accommodate those who prefer a quick and easy read, yet do not want to die without a taste of systems theory. This holds for the German text, too. If one seriously undertakes to work out a comprehensive theory of the social and strives for sufficient conceptual precision, abstraction and complexity in the conceptual architecture are unavoidable."[122]

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[121] Luhmann, 'Instead of a Preface to the English Edition [of 'Social Systems']: On the Concepts "Subject" and "Action"', *Social Systems*, Trans. Bednarz, Jr. with Baecker, (Stanford University Press, 1995) pg. xlix

[122] Luhmann, 'Instead of a Preface to the English Edition [of 'Social Systems']: On the Concepts "Subject" and "Action"', *Social Systems*, Trans. Bednarz, Jr. with Baecker, (Stanford University Press, 1995) pg. xxxvii

4.1.3 Luhmann and Self-Reflexivity

Luhmann claimed that the synthesis of a systems-theoretical approach and Sociology radicalises the methods of Sociology by allowing for a methodological self-reflexivity which he identifies as lacking. In short, Luhmann used systems-theory as a means by which to achieve a theory which could include within its own theoretical framework a reflection upon itself *on its own terms*. Thus through the use of systems-theory as a strategy of theoretical self-recognition Luhmann was able to claim a generality for his theoretical position. This was because, he claimed, the systems-theoretical approach:

> deals with everything social and not just sections (as, for example, strata and mobility, particularities of modern society and patterns of interaction, etc.)
>
> Theories that claim universality are easily recognized by the fact that they appear as their own object. (if they wanted to exclude themselves, they would have to surrender the claim to universality.) Thus it is - and this holds for all 'global theories' (including e.g., quantum physics) - that specific areas of the classical theory of science are suspended, in particular, everything having to do with independent confirmation of the theory's claim to truth....
>
> Therefore, theories that make a claim to universality are self-referential. At the same time, they always learn something about themselves from their objects. Therefore they are forced, as if by their own logic, to accept a limitation of their meaning.[123]

It is my intention throughout this thesis to use a similar synthesis of Art History and the systems-theoretical approach as a means for Art History to reflect upon its aims, methods and outcomes.

4.2 Cilliers – Postmodernity & Dynamical Systems Theory

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[123] Luhmann, 'Instead of a Preface to the English Edition [of 'Social Systems']: On the Concepts "Subject" and "Action"', *Social Systems*, Trans. Bednarz, Jr. with Baecker, (Stanford University Press, 1995) pg. xlix

Paul Cilliers has provided an excellent commentary on the observable connections between, what he identifies as, *Complexity and Postmodernism* (1998). In the following (concluding) chapter section on post-modernity and the systems-theoretical approach I argue, following Cilliers, that a shared critical impetus can be identified between the critique of the metaphysical systems of structuralism (be these social, political, moral or philosophical structuralism) which informs post-modernity and the multiple and relative perspectives of *Dynamical Systems Theory.*

In his discussion Cilliers argued that the studies of Complexity and Postmodernity (understood as Deconstructionism) operate according to a shared set of values. He stated:

> Saussure's 'structural' model of language remains a landmark in the study of complex systems. His primary insight - that meaning is generated through a system of differences - remains an excellent way of conceptualising the relationships in a complex system. His model is somewhat 'rigid', but Derrida's transformation of the system of the system by means of a sophisticated description of how the relationships interact in time (using the notion of *différance*) provides us with an excellent way of conceptualising the dynamics of complex systems from a philosophical perspective.

And,

> Since it is based on a system of relationships, the post-structural inquiry into the nature of language helps us to therorise about the dynamics of the interaction in complex systems. In other words, the dynamics that generates meaning in language can be used to describe the dynamics of complex systems in general.[124]

From within a systems-theoretical approach Cilliers identifies language, as Saussurre and Barthes[125] et al. do, as a (normative) system of

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[124] Cilliers, *Complexity and Postmodernism*, (Routledge, 1998), pg. 37; a central theme of Cilliers arguments concern connectionism and representation within complex systems in relation to a conception of postmodernity.

[125] "semiology aims to take in any system of signs, whatever their substance and limits; images and gestures, musical sounds, objects and the complex association

differentiation in which the sign is a 'node in a network of relationships.' Language is hence seen as a *system* of representation. He concludes that: "in the language of systems theory, Sausurre still understands language as a closed system, whereas Derrida wants to argue for language as an open system,"[126] and in which, "meaning is determined by the dynamic relationships between components of the system."[127]

Through his example of linguistic analysis Cilliers provides one case of the possible interconnections between the contemporary epistemological technologies of post-structuralism and the systems-theoretical approach. He does this through identifying a correspondence between the post-structural critique of language, in which meaning is understood as an unstable, complex, chaotic, non-linear system and the systems-thinking view of unstable, complex, chaotic, non-linear systems in general.[128]

I argue further that the correspondence between theories of Complexity and Postmodernity can be understood in terms of a definition of Modernity. This is to say that a common ethos is shared between the two can be couched in terms of the project of (social and philosophical)

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of all of these, which form the content of ritual, convention or public entertainment: These constitute if not languages, at least systems of signification." Roland Barthes, *Elements of Semiology*, (trans. Annette Lavers & Colin Smith), (1967, Jonathan Cape) pg. 9

[126] Cilliers, *Complexity and Postmodernism*, (Routledge, 1998) pg. 42

[127] Cilliers, *Complexity and Postmodernism*, (Routledge, 1998) pg. 46

[128] This is discussed further in the following. Hayles (ed.), *Chaos and Order*, (University of Chicago Press, 1991) which contains several discussions on the application of complex dynamics to a study of literature. Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*, (University of Chicago Press, 1999) in which Hayles further applies systems-thinking and in particular Artificial Intelligence (connectionism) to a study of literature. This was a theme she had already visited in Hayles, *Chaos Bound: Orderly Disorder in Contemporary Literature and Science*, (Cornell University Press, 1993). Also Aarseth, *Cybertext: Perspectives on Ergodic Literature*, (John Hopkins University Press, 1997) is a thorough and thought provoking study of hypertext and its history as a literary form in relation to a systems-thinking approach (broadly conceived).

Modernity; and more specifically Modernity as understood as the proliferation of the establishment of *systems* (of meaning, differentiation and control.) As Rasch has observed; modernity, postmodernity and systems-thinking can be conceived of as conterminous. He wrote:

> If the initial, eighteenth-century differentiation of reason associated with the name of Kant came to be seen as the problem of modernity that supposedly needed overcoming, then the subsequent uncontrolled proliferation of languages, system rationalities, and observer positions would seem to signal unsurpassable modernity's irreversible triumph. ... Thus, if the critique itself is legitimate, then it must be located within the heart of modernity itself. Postmodernism's skeptical, ironic, and unrelenting critique of modernity's more ambitious projects must, in fact, be the quintessential modern gesture, a type of immune system attacking the anxieties that have produced the fevered delusions of foundation and future reconciliation...Postmodernity, were one to retain the word, would then be seen not as the result of the exhaustion or of the disillusionment with modernity but rather as a new realization of modernity's self-imposed limits.[129]

Rasch's observations were being used specifically to identify Luhmann's systems-theoretical approach as a continuation of, rather than a break from, Modernity's project of self-criticism and self-determination[130]. I argue that *Dynamical Systems Theory* as a whole can be similarly characterised. In doing so *Dynamical Systems Thinking* can be re-configured as a *post-metaphysical modernism*; one in which the 'deep-structure' of systems is identified but with two further implications which demonstrate its affinity with postmodernity. These are that from within the systems-theoretical approach:

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[129] Rasch, *Niklas Luhmann's Modernity*, (Stanford University Press, 2000) pg. 9.
[130] For Luhmann's own commentary on this see: Luhmann, 'Deconstruction as second-order observing.' In, *New Literary History*, 24, (4; 1993), pg. 763-782.

1 - systems are identified in order that their structures and processes by which 'meaning' is produced can be *deconstructed*; hence identifying *Dynamical Systems Theory* with Deconstructionism in general

2 – systems are identified as being relative to the discursive systems by which they are identified and represented; hence identifying *Dynamical Systems Theory* with the postmodern 'incredulity toward metanarratives.'

This isomorphism shared between Modernity, Postmodernity and Dynamical Systems Theory can also be compared to what Rasch identified in Luhmann's praxis as:

> The ability to perceive this deep structure [which] becomes the ability to read surface complexities symptomatically as manifestations of a rationally comprehensible totality… [And] For theory to have social import - which is to say for theory to live up to its purported imperative to change and not just understand the world - it must be able to articulate the connection between deep and surface structure in such a way as to make the deep structure eminently alterable. It must grasp the deep structure, in other words, *from some perspective that is itself not determined by that structure.* To fail to do so would be to fail in one's duty as either a Marxian historical materialist or a Straussian political Philosopher.[131]

It is proposed that the 'deep structure' of which Rasch talks can be articulated in terms of the differential *system* of contingencies, but which is nonetheless a function of its own discursive system and is not an extra-discursive structure. This allows us to represent (Marxian) base and superstructure (of communicative technology and the social system) as inextricably linked and not as a dichotomy of conflicting forces but rather as an organic and systemic unity which displays the behavioural patterns of a complex system such as internal self-organization, auto-catalytic behaviour and emergent properties.

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131 Rasch, *Niklas Luhmann's Modernity*, (Stanford University Press, 2000) pg. 6

Rasch continued:

> If the conflict of perspectives is not to be reconciled from a higher-order metaperspective; if, in other words, a universal perspective of the morally Good or ontologically True cannot be occupied; if, rather, such perspective must compete on the same level as all others, with no hope of logical or divine resolution; then, ironically, the statement that describes this state of affairs must 'pose' as a metastatement and 'occupy' this impossible metaperspective. To describes adequately the ineluctable necessity of the contingency of modernity, the perspective of the metaperspective has to be filled with the assertion that there is no metaperspective, and, thus, the description of modernity as contingent has to serve as modernity's 'transcendental' ground.[132]

It is from a new, *multiple and contingent* meta-perspective of which Rasch talks that *Dynamical Systems Theory* emerges as an epistemological, heuristic system of observation which is isomorphic to postmodernism. And moreover as it is being used in my thesis as a strategy to be applied to Art History it is also seen as being a continuation of, rather than a radical break from, Modernist Art History (as it is expressed in the project of Kunstwissenschaft.)

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[132] Rasch, *Niklas Luhmann's Modernity*, (Stanford University Press, 2000) pg. 24 ff. One of Rasch's arguments is that Luhmann tackles the problem of the meta-perspective of discourse from within the contingencies of the Modern perspective through application of the paradigms of systems-thinking.

CHAPTER 2:

PUTTING SYSTEMS-THEORY INTO PERSPECTIVE

The essence of technology is by no means anything technological. Thus we shall never experience our relationship to the essence of technology so long as we merely conceive and push forward the technological, put up with it or evade it. Everywhere we remain unfree and chained to technology, whether we passionately affirm or deny it.
Martin Heidegger[133]

The status of knowledge is altered as societies enter what is known as the postindustrial age and cultures enter what is known as the postmodern age. This transition has been under way since at least the end of the 1950's
Lyotard[134]

Introduction

In this chapter I advance the following claims:

1 – That Art History is a discourse which is inherently Typographical; that is that it is configured according to a particular communicative technology.

2 - That we now live in a post-typographical age; and more specifically that art after modernism takes place in a post-typographical social system.

3 - That therefore Art History in its Typographical form is an unsatisfactory discursive model for accounting for the artistic practice of the 2nd half of the 20th Century.

4 - That Dynamical Systems Theory is a post-typographical form of knowledge which is therefore highly appropriate as a strategy by which to observe art and art history from the second half of the 20th Century.

To demonstrate this relationship between systems of communication and structures of knowledge in the arguments that follow,

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133 Heidegger, *The Question Concerning Technology*, (Harper Colophon,) pg. 5
134 Lyotard, *The Postmodern Condition: A Report on Knowledge*, Trans. Bennington/Massumi, (Manchester University Press, 1984) pg.3

I will use the particular example of single point linear perspective (as rediscovered in the Western Renaissance) to illustrate the connections between visual representation and epistemological structures in the modern, or (what I identify as) the Typographical age. More specifically my argument focuses on the centrality of the universal and sovereign human subject in Modern, typographic, systems of knowledge. Thus, what will be investigated in this chapter is Panofsky's thesis that linear perspective is the 'symbolic form'[135] of Renaissance epistemology. However Panofsky's argument will be adapted by demonstrating how this broadly 'modern' type of knowledge is linked to other technologies of communication. In doing so the invention of the printing press will be linked to not only a visual mode of analysis but also the emergence of modes of thought which will be called typographical.

Extending this line of thought further it will also be argued that the tradition of Art History (of the type introduced and critiqued in the arguments of the Introduction) is also hardwired with the same epistemological structure of typographical thought. In doing so an interrelationship is posited between Art History and technology; and more specifically the technology of the printed word.[136] What follows below is a critique of the same canon but from a widened perspective. Hence it will be argued that Art History in its form as *Kunstwissenschaft* or the canon of

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135 Panofsky, *Perspective as Symbolic Form*, trans. Wood, (Zone,1991)

136 In Chapter 1 it was argued that Art History was limited by its own perspective of Modernity by being bound to visuality. From within the perspective of Visual Modernity this can be linked to the technology of photographic reproduction which makes it possible to study of works of art regardless of their actual physical location. Examples of the reliance of the photograph on the functioning of Art History from its Modern foundations include Wölfflin's *Art History Without Names* performed via the technology of the dual slide lantern; Warburg's juxtaposition of images in the picture atlas *Mnemosyne* and Malraux's conception of a *Museum Without Walls* made possible through an archive of photographic reproductions.

The Critical Historians of Art, is not only a visual mode of analysis but also a typographical form of knowledge. And to develop this argument an interconnection will be observed between perspective and Art History in relation to typography.

It is noted, however, that my intention is not to provide another account of the History of Art History restated from within a technological determinist point of view. Instead the specific example of a particular type of Art History in relation to typography will be used to cast a juxtaposition between typographically configured systems of knowledge and our contemporary situation; a situation which is identified as post-typographical. In doing so a discontinuity between typographical thought and the post-typographical strategies of the Systems-Theoretical approach is identified. Implicated in this paradigm shift are the systems of Art History. Dynamical Systems Theory, on the other hand, is a contemporary epistemological technology and thus inseparable from the communications revolution, of the closing forty years of the Twentieth Century.

The history of technology[137] is, by necessity, as old as the history of humanity. Given the enormity of the subject matter regarding the nodes and interconnections between technology, society and culture in terms (not least the Marxian model of the base - superstructure system of social organisation and teleology) I will concentrate below upon one pertinent aspect of this broad topic. This is the area of communications technologies in their connection to epistemological systems. I argue that

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[137] Technology is identified as the: "practical application of scientific method and scientific conclusions whether in peace or war. Technology is the science of means, and as science advances so does technology." From Scruton (ed.), *A Dictionary of Political Thought*, (1982, Macmillan Press,) Pg. 458

these two systems are inter-related in terms of the meaning[138] produced by and within them. This is to say that different modes of communication, which are grounded upon *representations*,[139] (for example the visual communication of an artwork,) can be regarded as the manifestations of a specific epistemic structure.

To achieve this juxtaposition I will formulate my position using the vocabularies of the systems-theoretical approach. Thereby I will be able to observe the key systems theoretical concepts of feedback and communication in operation in two different but co-existent social systems. The central issue in relation to this is that there is a common set of issues can be seen to be shared between systems. In the arguments below I identify these systems as:

1 - *Systems of communication* These are social systems such as the printed word, and the visual system of linear perspective both of which are used as examples in the arguments below.

and

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[138] Luhmann dedicates a entire chapter (2) in *Social Systems* to discussing the concept of meaning in terms of self-reference within social and psychic systems. He has written: "structures and processes that employ meaning can include system boundaries and environments, which take on meaning within the processes of a self-referential system (not in themselves!), so that such systems can operate internally with the difference between system and environment. For all internal operations, meaning enables an ongoing reference to the system itself and to a more or less elaborated environment; the choice of the main focus of orientation can thereby be held open and left to the connecting operations that reproduce meaning through internal and external references." In Luhmann, *Social Systems* (trans. Bednarz jr. & Baecker), (Stanford University Press, 1995) pg. 37

[139] NB – I discuss my specific use of the term representation in much more detail in chapter 6. It is my contention that whilst representation takes place within complex systems that this is a *distributed* representation. Following Smolensky and Cilliers I argue that this is different form of representation to traditional or 'iconographic' representation where there a direct correspondence is posited between referent and reference. Instead the *distributed representation* of complex systems is a representation which is 'distributed' over the entire system.

2 - *Systems of knowing.* These are epistemological systems by which knowledge is produced. Because discourse is such a system both Dynamical Systems Theory and Art History are also observed in systemic terms.

This in turn raises issues related particularly to two points of the following discussion, they are:

1 - *Meaning produced by systems;* and what is identified here is a schema of systems which comprises:

(i) social systems (systems of social organisation)

(ii) epistemological systems (systems of knowledge)

(iii) communicative systems (systems of communication)

(iv) psychic (systems of cognition and self-awareness[140])

2 - *Communication between and amongst these systems.*

In advancing these augments this chapter follows the following structure:

<u>1 - Elective Affinity</u>

In this section I outline the concept of elective affinity in order to demonstrate the inter-relationship between technology; epistemological, communicative and artistic systems and social systems in terms distinct from technological determinism.

<u>2 - Technology and the Psychic System</u>

In which I look at the relationship between the individual and the technological development of social systems.

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[140] Luhmann refers to the concept of the human subject as a psychic system which circulates within larger social systems - see *Social Systems*, chapter 7.

3 - The typology of typography

In which I outline the type of knowledge configured by typography as a communicative technology.

4 - Art History as Typographic Knowledge

In which I outline the thesis that Art History is also a typographic form of knowledge.

5 - Contemporary Issues

In which I allude to the argument that the Systems-Theoretical approach (as I apply it within Art History) is a post-typographical form of knowledge; and functions differently as a result.

1 - Elective Affinity

In this section I address the relationship between technology, the social system and the psychic system in terms of Weber's concept of 'Elective Affinity.'[141]

As I discuss in further detail below; in an argument specific to the effects of typography, Mcluhan juxtaposed the preliterate, non-Western tribal human with both Western 'scribal man' (a product of 'manuscript culture') and 'typographic man' (a product of 'print-culture'). However in my view it is not sufficient to merely identify a simple cause and effect between technology and a teleology of social systems as might be done in an argument informed by technological determinism in the case of Marxist sociological accounts. To avoid the tautological position of technological determinism it is asserted that it is not simply sufficient to argue that the

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141 Although the term was first used by Goethe in his novel *Die Wahlverwandtschaften* (1809) it receives its application in discourse through Weber's adoption of the term.

empirically verifiable consequence of development of social systems (in this case technological change) is the cause of that social development. As Damisch has observed:

> Without doubt, any thesis according to which culture informs perception in a way that allows us to say that culture is perceived is circular, though it is advocated by any analyst pretending to acknowledge in a period's artistic production the expression of a vision of the world whose very concepts it would determine.[142]

Again in relation to the technology of the printed word, in a position similar to that advocated by Goldstein (with reference to an extended discussion on Engels in relation to Marxist 'Reflection Theory' and the possible connections between society and the individual) [143] Jay has also noted the problem of how technology and epistemology might be related with reference to both typography and perspectival models in a way so as not to second-guess the conclusion.

"Making a strong case for a causal relationship between the invention of perspective and the rise of capitalism may be problematic," [144] he argued. Instead Jay suggests that the term *Elective Affinity* should be used instead.

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142 Damisch, *The Origin of Perspective*, trans. Goodman, (MIT Press, 2000) pg.31

143 'It is not that the economic position is the *cause and the alone active*, while every thing else has a passive effect. There is, rather, interaction on the basis of the economic necessity, which *ultimately* always asserts itself' from Engels' letter to W. Borgius January 15th 1894, in Marx and Engels, The *Correspondence of Karl Marx and Friedrich Engels, 1846-1895*, Trans. Dona Torr, (International, 1936 [1934]); quoted in Goldstein, *The Social and Cultural Roots of Linear Perspective*, (MEP Publications, 1988) pg. 137

144 Jay, *Downcast Eyes*, (University of California Press, 1993) pg. pg.57-8. Jay's statement here is in part a direct response to Goldstein's own invocation of Weber's methodology in *The Social and Cultural Roots of Linear Perspective.* Jay however does not credit Goldstein fully with his own position and dismisses him somewhat as an 'orthodox Marxist' saying: 'The most orthodox Marxist of these commentators, Goldstein goes so far as to claim that although changes in musical and poetic form antedate any evidence for the capitalist division of labor by several centuries, since the causal relationship works for painting, it must also explain these earlier phenomena!' - Jay, *Downcast Eyes*, (University of California Press, 1993) pg. pg.58 fn. 121.

The term *Elective Affinity* is taken from Weber's observations that there is both an "elective affinity of Calvinism...for capitalism" and an "elective affinity of the bourgeoisie for certain life styles" in connection with the 'Protestant work ethic.'[145] Elsewhere Weber also argued that:

> We can generalize about the degree of elective affinity between concrete structures of social action and concrete forms of organization; that means, we can state in general terms whether they further or impede or exclude one another whether they are *adequate* or *inadequate* in relation to one another[146]

Both Goldstein and Jay[147] invoke Weber's employment of this term 'elective affinity' in relation to their own commentaries on the relationships between social and psychic systems. Weber used this term *elective affinity* (Wahlverwandtschaft) to explain the systematic relationships between epistemological systems and social systems with reference to the human subject; and his analysis of Protestantism as having an elective affinity towards capitalism in *The Protestant Ethic and the Spirit of Capitalism* provides an example for the position that I develop in the subsequent arguments of this chapter.[148] Taking this as a working method, the next section of this chapter will look at the elective affinities between various technological, social and epistemological systems.

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145 Weber, *The Protestant Ethic and the Spirit of Capitalism*, [trans. Talcott Parsons,] (Unwin Paperbacks, 1985)

146 Weber, *Economy and Society*, eds. Roth & Wittich, (Bedminster Press 1968) pg. 341

147 Goldstein, *The Social and Cultural Roots of Linear Perspective*, (MEP Publications, 1988); Jay, *Downcast Eyes*, (University of California Press, 1993) pg. pg.57-8

148 It should, however, also be noted that Weber's concept of *elective affinities* is not without difficulty given confusion arising from his ambiguous use of the term. This has been discussed by several commentators; see especially: Gerth & C Wright Mills., (eds.), *Max Weber: Essays in Sociology*, (Oxford Univ. Press, 1946); Thomas, "Ideology and Elective Affinity", *Sociology*, (Vol. 19, Issue 1, 1978) pg. 39-54; Howe, "Max Weber's Elective Affinities: Sociology Within the Bounds of Pure Reason", *American Journal of Sociology*, (Vol. 84, Issue 2, 1978)

In their use of the term *Elective* Affinity both Jay and Goldstein, whilst arguably working from within what may be loosely defined as a Marxist sociological model, eschew the crude Marxist interpretation of the top-down influence in social systems from the material base to the social superstructure. Instead they both favour a model of the interrelationship between the material, process and structures of social systems which sees the cause and effect relationships between them as reciprocal. This position is consistent with a cybernetic model of social systems in terms of processes of feedback and is also integral to the position of Dynamical Systems Thinking (as is seen in Luhmann's analysis of *Social Systems* and Weiner's systems-thinking model of society in *Cybernetics and Society*.)

In a cybernetic conception of social systems the observation of connections between various elements within the social system is conceived in terms dissimilar to the simple and one-way cause and effect relationship of technological determinism. From a systems-theoretical perspective such relationships might be seen instead as the diverse, cybernetic, non-linear, patterns of positive feedback and *distributed* representation that characterise complex systems.

Thus it is argued that there is a matrix of influential forces which shape both the social systems of communication and control, the psychic systems of subjects who circulate within those social systems and the discursive systems of knowledge production. This supports the argument that the emergence of Dynamical Systems Theory, as a discursive system, is inextricably bound up with the revolution in communications media of the last forty years such as the microprocessor. In the same way the epistemology of the modern age, which is illustrated through the Cartesian

understanding of infinite space that is rationalised and, in turn, represented through single point linear perspective, is bound up with the revolution in communications media of the mid-fifteenth century and the simultaneous emergence of the printing press and typographical orders of knowledge. It is to this that I will now turn.

2 - Technology and the Psychic System

In this section I outline the connections between the technology and the human subject. I do this in order to advance the overall argument of this chapter that there are observable interconnections (elective affinities) between the technological state of social systems and the discursive systems produced by those social systems. More specifically I argue that Dynamical Systems Theory is a post-typographical form of discourse; that as such it should be differentiated from previous, typographical, discursive systems; and that this has implications for knowledge as it is produced and used by human subjects who are also configured by such systems.

If you were to believe the dejected postings in webboards all over the world, the second of March 2001 was the day the music died. On this day it seemed that the free trading of music on the Internet had effectively come to an end when Napster, the Internet software company which allows users to share music files with another and download them to their personal computer's hard-drive, bowed to increasingly intense legal pressure from the music industry and began the filtering over one million copyrighted song titles from its system. This was implemented to prevent the files being traded, free of charge, over the Internet in what *WiredNews* described as a: "last-gasp effort - partly endorsed by the

recording industry - to stay in business."[149] This marked the endgame of a battle which had begun in a U.S. District Court, in Northern District of California in December 1999 when the RIAA (Recording Industry Association of America), a consortium of the five major music companies in the world, launched a legal case against Napster to sue them for contributory copyright infringement. What had panicked the music industry so much was the implication that a communications technology (in this case Mp3 file compression which allowed for high quality music files to be traded efficiently over the Internet, coupled with CD burning capabilities which allowed for the production and copying of compact discs on a home computer) would dramatically alter social patterns of consumption. The record companies responded to the suggestion that as a result the sales of tapes, compact discs and records would evaporate if music could be shared for free over the Internet between personal computers.

The example of Napster is used here to provide just one example, contemporary to my writing of the thesis, of the inextricability between the technology of communications and the social systems by which human interrelationships are constituted, mediated and controlled. In this case technology changed peoples patterns of consumption and hence the ways in which they lived their lives.

The life of the human subject is framed and shaped by such technologies. And, as Foucault identified in his discussion on *technologies of*

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[149] 'Napster to Start Filtering Songs', *WiredNews* - (March 2nd, 2001), **(Newshttp://www.wired.com/news/politics/0,1283,42140,00.html)** [Consulted March 2nd, 2001.]

the self, they can extend to include all technologies by which the self is regulated and are historically determined in so far as they can be different at different times and places:

> Everything propitious to the development of a technology of the self can very well be analysed, I think, and situated as a historical phenomenon - which does not constitute *the* bifurcation of reason. In this abundance if branchings, ramifications, breaks and ruptures, it was an important event, or episode; it had considerable consequences but it was not a *unique* phenomenon.[150]

2.1 – McLuhan

The relationship between technologies of communication and the effect they have on the people who use those technologies is one that has been investigated by length by Marshall Mcluhan. Mcluhan suggested that because: "societies have always been shaped more by the nature of the media by which men communicate than by the content of the communication,"[151] then we might understand that the introduction of new technologies of communication at different historical moments will have various social consequences. Examples of this include technologies of communication such as the phonetic alphabet and the printing press causing shock-waves within the power dynamics of social systems and also the discourses on Modernity which relate it to the invention of the photograph.[152]

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150 In 'Structuralism and Post Structuralism', *Aesthetics, Method and Epistemology*, ed. Faubion, (Penguin, 1998) pg. 442; see also Foucault, *The History of Sexuality*, (Penguin, 1981)

151 Mcluhan, *The Gutenberg Galaxy*, (Routledge and Kegan Paul, 1962)

152 These include those discussions by Benjamin, Lyotard, Barthes who exemplify the arguments linking the photograph to Modernity. See: Walter Benjamin, 'The Work of Art in the Age of Mechanical Reproduction,' in Illuminations, (Trans. Harry Zohn), (Schocken Books, 1968) pg. 217-251; Lyotard, 'Presenting the Unpresentable,' in *Artforum*, 3, (April, 1982) and Barthes, *Camera Lucida: Reflections on Photography*, (Fontana, 1982)

Mcluhan argued that systems of communication (such as the printed word, or the television) are the means by which the psychic system extends into the world via the feedback of the human nervous system. These media therefore provide the means by which to experience the world and communicate that experience. Thus:

> The effects of technology do not occur at the level of opinions or concepts, but alter sense ratios or patterns of perception steadily and without any resistance.[153]

A major implication of Mcluhan's argument is that the way in which the world is represented within the psychic system of the individual (according to the patterns of perception dictated by the sense impressions) is affected by the various systems of communication, information transfer, representation and knowledge within which that individual psychic system is located. He argues that the configuration(organisation) of the psychic system which circulates within the social system organised according to pre-typographic principles generates a human subject which, in the words of McLuhan, "lives in the implicit magical world of the resonant oral word" in which space and time are conceived as an organic unity; and in which there is: "an acoustic, horizonless, boundless, olfactory space."[154] This is differentiated from the linear, objective and transparent 'visual space' configured by the Western, literate world-view.

Ong has expanded on the suggestions of Mcluhan with reference to the balance of human sensory experience within print cultures and has argued, most notably in *Orality and Literacy* (1982), that it is a predominately

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153 Mcluhan, *Understanding Media: The Extensions of Man*, (Routledge and Kegan Paul, 1964) pg. 27
154 Mcluhan, *The Gutenberg Galaxy*, (Routledge and Kegan Paul, 1962)

visually experience in such cultures. This argument has also been formulated by Steiner (in *Language and Silence* (1967)) and Lowe (*History of Bourgeois Perception* (1982)). The significance of such questioning upon my own arguments here lies in their gravitating around the impact upon the impact of technology upon the human subject; and more specifically the sovereignty of the individual 'modern' subject which is at centre of both typographic epistemology, and single point linear perspective toward which my discussion turns below.

Mcluhan equates the move within print culture to the primacy of visual experience, catalyzed by the act of reading texts linearly[155] with a new form of logical, objective and 'linear' thought. He says:

> "Rational", of course, has for the West long meant "uniform and continuous and sequential." In other words, we have confused reason with literacy, and rationalism with a single technology. Thus in the Electric age mans seems to the conventional West to become irrational.[156]

And elsewhere in conversation:

> *McLuhan* - Well, I think people who are subjected to the arrangement of language visually in lines, highly sequential and precise rigid, develop habits of arranging their lives, arranging their whole social existence, which are very closely geared to these forms. They're not specially aware of this. Linearity, though, is not characteristic of radio or television or movies. And so we have been subjected to tremendous new forces, new influences which have broken up the older habits acquired from the print world.
> *Seldes* - Would you say we tend to think in straight lines?

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[155] This does not necessarily mean that we must read a book from beginning to end in only one order in order for them to make sense; however as Aspen Aastheth has argued in, *Cybertext*, (1997, John Hopkins Press,) textual narrative is inherently linear as opposed to the non-linearity of hyper-text which he identifies in both the I-Ching and the non-linear fiction of Michael Joyce – both of which are used as examples of texts which do not dictate the order in which they should be read.

[156] Mcluhan, *Understanding Media: The Extensions of Man*, (Routledge and Kegan Paul, 1964) pg. 245

> *McLuhan* - We still like to speak of following a person, or drawing conclusions in lines. And I don't follow you, and I do follow you, sort of thing, it does suggest, yes, that we think of thought itself.[157]

3 - The typology of typography

Thus far it has been argued that by adopting a systems-theoretical approach *elective affinities* can be observed between different social systems of communication and systems of knowledge. It was further argued that such an approach is illustrative of a systems-theoretical analysis of the cybernetic operations within social systems. Implicit in these arguments is the assertion that such 'elective affinities' as shared between communicative and epistemological systems are understood as systems of representation; hence the elective affinity identified between a visual model (artistic perspective), mechanical systems of typography and a 'world-view' which all operate according to a particular representative model which stands in direct contrast to the model of *distributed* representation of the post-typographical systems of which Dynamical Systems Theory is exemplary.

I will now look to some issues regarding the nature of typographical knowledge. In doing so the type of knowledge which I'm referring to here as typographical can be investigated more specifically with regards to the concepts of communication and representation. I do this by looking at some historical issues regarding the development and dissemination of the printed word. This not only provides a useful analogue from history for the current historical situation of the emergence of new communicative technologies (as witnessed over the last 40 years) but also has two other implications. These are:

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157 Ohio State University Interview by Gilbert Seldes, Edgar Dale, Keith Tyler, 1958, [from http://www.netsoc.tcd.ie/~steo/mcl/inter1.html]

(i) The establishment of the conditions of the epistemological and social systems from which the post-typographical situation of a systems approach is discontinuous.

(ii) Returning the discussion to Art History. This is in so far as it has been argued (in the Introductory chapter) that Art History is a modernist discourse; and is further demonstrated by its elective affinity with not only a model of visual representation (single-point linear perspective) but also with the technological correlate of this representative model namely mechanical typographic reproduction.

3.1 A brief history of Type

The Typographical Age began five hundred years ago. As Steinberg has noted; the 'first century of printing' of 1450-1550 (the incunabula period[158]) emerges at the very beginning of the sixteenth century with the appearance of the printed book facilitated by Gutenberg's development of movable type at some time between 1440 and 1460.[159] Much has been written about the various implications of such a development and, as already mentioned

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158 'The word *incunabula* was first used in connexion with printing by Bernard von Mallinckrodt, dean of Münster cathedral, in a tract, *De ortu et progressu artis typographicae* (Cologne, 1693), in which he contributed to the celebration of the second century of Gutenberg's invention. Here he describes the period from Gutenberg to 1500 as "*prima typographiae incunabula*", the time when typography was in its swaddling clothes. The French Jesuit, Philippe Labbé, in his *Nova bibliotheca liborum manuscriptorum* (1653), already equated the word *incunabula* with "period of printing up to 1500". In the course of the eighteenth century men whose Latin was considerably shakier applied the term to the books printed during this period, and nineteenth century writers with ni Latin at all eventually coined the singular 'Inkunabel' 'incunable' 'incunabulum', to denote the individual item that emanated from the printing presses of the fifteenth century.' From Steinberg, *Five Hundred Years of Printing*, (Penguin, 1955) pp. 16

159 See Steinberg, *Five Hundred Years of Printing*, (Penguin, 1955) in which he identifies that by 1450 Gutenberg, in Mainz, 'had perfected his invention far enough to exploit it commercially', and that between 1452-56 he produced a 42 line bible. Pg. 18. A similar sentiment is found in Febvre and Martin, *The Coming of the Book*, trans. Gerard, (NLB, 1976)

the parameters of the multiplicity of discussions can be narrowed to manageable dimensions. There are, however three issues to note before continuing. They reflect the eschewing of a crude one-way causal relationship between elements within the social systems in favour of identifying elective affinities between various observed events and entities.

(i) The period between 1450 to around the middle of the 20th century will be taken as the period of the printed word. This thus precedes and includes the birth of photography in the 19th Century which is often seen as the beginning of Artistic Modernism. To avoid a confusion of terms the five hundred years of the printed word will be called *The Typographic Age.*

(ii) As Febvre and Martin have argued; printing itself did not lead to massive leaps in scientific knowledge but rather facilitated the dissemination of information - both useful *and specious* - to a larger audience of scientists and non-scientists alike.[160] It is thus an emblem rather than the sole mechanism of more general social shifts away from medieval systems of social organization and stratification which were taking place at this time – identified here as the beginning of the Typographic Age. They wrote:

> So printing does not seem to have played much part in developing scientific theory at the start, though it seems to have helped draw public attention to technical matters... [provided are] so many clues to a new outlook which was already apparent in the numerous technical advances made in as many fields in the first half of the 15th century. And printing after all was simply the most spectacular... It is fairly evident at the outset that printing brought about no sudden or radical transformation, and contemporary culture hardly seems at first to have changed, at least as regards its general characteristics.[161]

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160 Febvre and Martin, *The Coming of the Book*, trans. Gerard, (NLB, 1976)

161 Febvre and Martin, *The Coming of the Book*, trans. Gerard, (NLB, 1976) pg. 259-60

(iii) The significance of Gutenberg, as the figure where the Typographic Age begins, should not be misconstrued. He did not, for example, invent the book, or even the printing press. However Gutenberg's innovations were indicative of more general social change and the emergence of typographical modes of thought. As Steinberg has noted:

> To nine out of every ten readers the sentence that "Gutenberg invented printing" is a shortened form of "Gutenberg invented the printing of book". The inevitable association of Gutenberg's name with the 42-line Bible tends to strengthen this fallacy. For it is not - certainly not primarily - the mechanical production of books which has made Gutenberg's invention a turning point in the history of civilization. Books were printed before Gutenberg and there is no reason why printing from wood-blocks, engraved metal plates, drawings or photographs on stone, and other media should not have gone on with greater refinement - as it has actually done. The books 'printed' by William Blake and, now, filmsetting come readily to mind as examples of printing without movable type. What was epoch-making in Gutenberg's process was the possibility of editing, sub-editing, and correcting a text which was (at least in theory) identical in every copy: in other words, the uniform edition preceded by critical proof reading. The identity of each copy of each edition extends even to the misprints which, in turn, can be atoned for by identical "errata" slips.[162]

Knowledge as a social phenomenon in the typographic age was not born from the big bang of the typographical revolution of the Renaissance. The way people knew about the world did not change as if over-night. This is demonstrated by the distribution of the written word before the invention of moveable type, via the chirographic traditions of manuscript writing and printing using non-moveable type (such as wood-cut blocks.) Also of note is the subsequent non-standardisation (in terms of information) and disparities within the texts produced in the typographical age. The technology of print, and increase in the literal capabilities of populations did not, in itself, lead to a universal knowledge, but was instead

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162 Steinberg, *Five Hundred Years of Printing*, (Penguin, 1955) pg. 20

related, via processes of feedback, to general changes within the social system. Thus, whilst knowledge itself did not arrive with the invention of the printing press, it is instead claimed that from such technologies emerges a new type of knowledge. This is to say that with the arrival in western society of different methods of organising, systematising communicating and distributing information we see the emergence of a different type of knowledge - typographical knowledge.

The numerous and varied shifts within the structure of social systems from the Renaissance onwards has been attributed to the proliferation of literature produced by the new technology of the printing press in various ways. Since Steinberg's history of *Five Hundred Years of Printing* (1955)[163], in which he introduced some of the history of interrelations between culture and communications technology, there has been a proliferation of studies looking at the different type of typographical knowledge which was produced and relating this to a broadly Modern sensibility. Examples already cited include Febvre and Martin's *The Coming of the Book* (1958, English translation 1976) and Eisenstein's investigations into *The Printing Press as an Agent of Change* (1979)[164] both of which include discussions on the role of the printed word in the Protestant reformation for example in the spread of Lutheranism and Calvinism via the production of propaganda literature and pamphlets[165].

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163 Steinberg, *500 Years of Printing*, (Penguin, 1955)
164 Eisenstein, *The Printing Press as an Agent of Change*, (Cambridge University Press, 1979). This is a two volume work which appears in an abridged form as *The Printing Revolution in Early Modern Europe*
165 Febvre and Martin, *The Coming of the Book*, pg. 287-319

The distribution of printed texts has also been cited as a major factor in the birth of the nation state, and subsequent rise of nationalism in the modern historical era. For example Febvre and Martin discuss the role that the distribution of printed works played in the establishment first of literacy then national identity. This identity could then be expressed in terms of a shared language and customs and was identified and defined through that common language and distributed via multiple texts. This became crystallized through the production of texts printed in the vernacular of particular regions and the waning of Latin as the universal language of academia. The implication of this was, they argued, that:

"The unified culture of Europe was finally dissolved by the rise of the vernacular languages which was consolidated by the printing press."[166] Such an argument had been rehearsed by Mcluhan who argued 'the Printed Word: Architect of Nationalism.'[167] Anderson (in *Imagined Communities*) further explored the area of the birth of nationalism in relation to a Marxist analysis of social relationships and in doing so implicated the genesis of typography with spread of democracy and the expansion of the political franchise to larger sections of populations that were increasingly literate and thus self-aware (in terms of being given, and thus identifying with characteristics of identity and group coherence):

> These print languages laid the bases for national consciousness in three distinct ways. First and foremost, they created unified fields of exchange and communications below Latin and above the spoken vernaculars. Speakers of the huge variety of Frenches, Englishes, or Spanishes, who might find it difficult or even impossible to understand one another in conversation, became capable of comprehending one another via print and paper. In the process, they gradually became aware of the hundreds of

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166 Febvre and Martin, pg. 332

167 Chapter 18, *Understanding Media; The Extensions of Man*

> thousands, even millions, of people in their own particular language-field, and at the same time that *only those* hundreds of thousands, or millions, so belonged...
> Second, print capitalism gave a new fixity to language, which in the long run helped to build that image of antiquity so central to the subjective idea of the nation...
> Third, print capitalism created languages-of-power of a kind different from the older administrative vernaculars.[168]

This presents the question: what 'type' of knowledge was typographical knowledge?

Eisenstein defined the (initial) features of systems of knowledge within print culture according to the following criteria[169]:

(i) Dissemination; (ii) Standardization; (iii) Reorganization; (iv) Data Collection; (v) Preservation; (vi) Amplification; (vii) (shift from) hearing to reading; (viii) (the establishment of) The republic of letters, which I will now discuss in further detail.

Regarding dissemination and distribution of texts, the arrival of the press had an enormous impact. One of the straightforward reasons for this is that after the initial manual work (of typesetting, editing[170]) and so forth required to produce the first copy of a text subsequent copies of a theoretically almost infinite number could be produced with relative ease. As observed by Febvre and Martin: "there were no technical difficulties about producing 'large' editions even with the earliest, or almost the earliest presses."[171] Further, this actually encouraged printers to produce more copies in order to recoup the initial and unavoidable outlay required for the

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168 Anderson, *Imagined Communities: Reflections on the Origins and Spread of Nationalism*, (???) pg. 47-8
169 Eisenstein, *The Printing Press as an Agent of Change*, (Cambridge University Press, 1979) Chapter 2
170 For a full description of the processes involved in the production of early printing see Eisenstein (1979) and Steinberg (1955)
171 Febvre and Martin, *The Coming of the Book*, pg. 217

first edition. it was in the interests of printers and booksellers alike to produce and sell as many copies as the market could handle, because in doing so they minimized the relative cost of each copy and thus maximized the profit margin relative to their production costs.

However it would be an overstatement to claim that proliferation, amplification and re-enforcement within textual and epistemological systems was the only implication of this new technology. It did not necessarily lead on its own, to the Copernican revolution within scientific knowledge in the Renaissance and the emergence of a typographic sensibility. It has rather claimed that:

> the contrary seems true in the case of the so-called scientific revolution. Exploitation of the mass medium was more common among pseudo-scientists and quacks than among Latin-writing professional scientists, who often withheld their work from the press. When important treatises did appear in print, they rarely achieved the status of bestsellers. Given the limited circulation of works such as *De revolutionibus* [by Copernicus, published 1543] and the small number of readers able to understand them, it seems plausible to play down the importance of printing.[172]

A consequence of this was that knowledge quickly became collaborative and accumulative as textual systems served as memory banks from which new discoveries were made. Textual systems have a memory by virtue of their physical permanence and reproducibility and this changes the nature of the knowledge that is retained and distributed via them. An example from history is provided by Eisenstein who wrote:

> As sixteenth-century astronomers, [Tycho and Copernicus] may be distinguished from their predecessors not so much because they were influenced by one or another Renaissance current of thought but rather because they were freed from copying or memorizing and could make use of new paper tools and printed texts.[173]

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172 Eisenstein, *The Printing Revolution in Modern Europe*, (Canto, 1983) Pg. 187
173 Eisenstein, *The Printing Revolution in Modern Europe*, (Canto, 1983) Pg. 215

Foucault has also noted that another aspect of social systems within a print culture is the prioritisation of textual systems in the creation and dissemination of knowledge:

> The use of the alphabet in as an arbitrary but efficacious encyclopaedic order... such an interweaving of language and things, in a space common to both, presupposes an absolute privilege on the part of writing. This privilege dominated the entire Renaissance, and was no doubt one of the great events of Western culture. Printing, the arrival in Europe of Oriental manuscripts, the appearance of a literature no longer created for the voice or performance and therefore not governed by them, the precedence given to the interpretation of religious texts over the tradition and magisterium of the Church - all these things bear witness, without its being possible to indicate causes and effects, to the fundamental place accorder in the West to Writing.[174]

Of specific relevance to my arguments here is Foucault's use of Writing as a proper noun and how this is related to a 'modern' experience. This is thereby distinguished from the process of scribing which is linked to the pre-Renaissance chirographic tradition. This is a phenomenon that Siskin has also observed. He argued that this effect magnifies in the following century as the *Work of Writing* as a practice emerges with the emergence of discourse about Writing and the birth of Literature as a discreet area of academic study. He noted:

> Writing proliferated [in the eighteenth Century] as something new through, in a large part, writing about writing - that is, writers throughout the eighteenth century were so astonished by the sheer volume of writing they began to encounter that they wrote about it - and thereby astonished themselves. The engine here was not the oft-cited growth of the reading public or rise in the literacy rate. To use *writing* as shorthand for the entire configuration of writing, print and silent reading, is to cast its proliferation as not simply a matter of when and how many learned a skill, but of skills interacting in practice.[175]

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174 Foucault, *The Order of Things*, (Routledge, 1974) pg. 38.
175 Siskin, *The Work of Writing*, (John Hopkins University Press, 1998) pg. 2

This position acknowledges a causal relationship between the technology of textual production and something of the nature of the texts produced. Changes in the nature of knowledge means other changes in the configuration of social systems which I will outline below.

The move from a pre-typographic and oral culture (in which social communication is primarily via the spoken word there being a relatively small amount of hand-written manuscripts) to a typographic culture (in which, due to the proliferation of the written word, as already mentioned, the dominant mode of social communication becomes the printed word) means an increase in the amount of reading taking place within the social system. This shift also translates into a social shift onto the process of reading texts (which is rooted in the visual-conceptual re-cognition of visual symbols, invariably from left to right - in the western European tradition), in that one is encouraged to read, linearly, in one direction, from beginning to end (be this word, sentence, paragraph, chapter or book.) This shift alters the organisation of the social system and its internal relationships and functioning. An example of this as discussed by Lowe, Goldstein and Eisenstein is the emergence of capitalism synchronously with the linear standardisation of typographical thought. Thus it is observed that the proliferation and development of capitalism as a system of social organisation and the reordering of social relations along the axes of the system of capitalism has an elective affinity with both the rise of modern science in the age of the printed book and the emergence of the printed word as the dominant means of social communication. The rationality of the typographical age is illustrated in increasing

standardisation and the reduction of words to their quantifiable component parts as letters on the page. This compartmentalisation and reification of words into parts serves as an allegory for the nascent capitalist system of social organisation.

In summary of the above, an argument shared amongst the various commentaries regarding what Eisenstein called, *The Printing Press as an Agent of Change* is that the type of knowledge produced within those epistemological systems shaped and mediated by the technology of typography has its own unique character. The transformation of systems of knowledge in the Typographical Age was not just an increase in quantity of data produced. Instead it brought with it a qualitative social change which defined the 500 years of the *Typographic Age*. Its character was distinct from the systems of epistemological representation in the pre-typographical (medieval) epoch and the time of post-typographical (identified here as related to the question of post-modernity) knowledge. Emerging from this is the argument that the post-typographical knowledge which is characteristic of a systems-thinking approach is discontinuous from the technological and epistemological paradigm that preceded it.

3.2 - Objectivity, Linearity, Transparency

In this section I further discuss the structures of systems of typographic knowledge. More specifically I do so in terms of those concepts which allow them to be related to single-point linear perspective – namely objectivity, linearity and transparency.

As discussed above the techniques of mechanical printing were not invented by Gutenberg alone; and, quite obviously, people read and wrote

before 1450. However the significant difference engendered by the advent of the typographical printing and typographical knowledge came in the form of a disassociate separation of sentence and words into the similar and interchangeable component units of the letter. This was both an analogous and literal separation. It was an analogous separation which was catalysed by the production of a literate society familiar with texts as a major apparatus of knowledge production and consumption - hence as people became familiarized with the textual form (as opposed to the spoken word) a shift was made to a typographical understanding of the disassociation between the letters on the page and the concepts to which they referred. It was also a literal separation which occurred in the physical process of the typesetter sorting and combining their metal letters into meaningful strings of words and sentences within the frame of the mechanical printing press. Following this separation these letters were subsequently constituted into the significant units of words, sentences and paragraphs which then acquire meaning by virtue of their situation within a system of representation and a system of meaning – a linguistic system. It is this division analogously, conceptually and literally, of the organic unity of the text into the component parts of the representative textual system which is illustrative of the dissociate nature of both typographical knowledge and the typographical subject. It is argued here that this model is also replicated in the visual model of single point, linear perspective.

Typographical systems of knowledge can be related to perspective because they are

(i) Objective

(ii) Linear

(iii) Transparent (not literally but conceptually).

(i) Typographical systems of knowledge are objective because of the particular understanding which they formulate. This is a disassociate understanding of words and sentences. It is an understanding that understands the words as comprised of discreet semantic and typographical units. The order of these units requires a conceptual constitution by the sovereign perceiving subject in order to be meaningful. This is a visual and conceptual knowledge system rather than an oral one; hence its claims to objectivity. The word or sentence isn't *heard* whole but rather seen and constructed; the meaning therefore is not grasped wholesale as it might be when transmitted orally. Instead meaning is objectively established from the singularly meaningless component parts which make up the text and given its meaning by virtue of the system of communication within which they are represented. Implicit in this transfer of meaning is a universal Humanist subject. Thus the 'meaning' of the words is assumed to be objective.

(ii) Typographical systems of knowledge are linear because having separated and logically disassociated the component letters; the re-constitution into meaningful units occurs in a linear fashion. Typographical knowledge is linear in the way in which meaning is subsequently generated by the typesetter who places letters sequentially, from left to right and from A to Z, within the matrix of the textual system. This textual system is then mechanically reproduced by the printer, distributed by the publisher and then read by the reader in a causal chain (normally understood as leading

from left to right and from top to bottom; although this is by no means always the case.

(iii) Typographical knowledge is transparent in so far as it is transmitted by systems which do not overtly co-transmit their own structural organisation as part of the message being transmitted. Thus the media of the message, whilst serving as the support for what is being represented, do not represent themselves in the representation. In typographical representation (and included in this broader use of the term is single point perspective) the representative media are transparent, they do not obscure or overlay representation. The 'transparency' of such systems is a quality which Foucault famously discusses in his introduction of *The Order of Things*. He uses the opening example of *Las Meninas*, in order to demonstrate how the perspectival system of artistic representation is illustrative of the type of conceptual transparency[176] which is characteristic of typographical knowledge in general.[177]

It is because of the alleged objectivity, linearity and transparency of Typographical Knowledge that means it is pre-disposed to the generation of 'objective' teleological and ontological systems of knowledge of the 'modern' age. In its apparent (conceptual) transparency, it is a denotative, significatory and classificatory type of knowledge. This is reflected in

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176 In terms of communication theory the 'transparency' of the media of support can also be conceived of in terms of the 'noise' of the materiality of support not interfering with the message transmitted via that support. This contributes to the alleged 'objectivity' of the representative system in so far as the transparency of the media of support is contingent upon a logical disassociation between the visual units of the text and the 'meaning' to which they are referring. The 'meaning', therefore, is not dependent upon the physical attributes of the material support of the code which is conceptually transparent; but is instead related to the ordering of the code itself.

177 This is what Foucault refers to as the *Classical* schema of representation. See Foucault, *The Order of Things*, (Routledge, 1970)

typographical and systematic epistemology (such as that of Descartes) and the various attempts within the five hundred years of the typographical age to establish objective *systems* of knowledge. As Mcluhan has stated:

> *System* means something to look at. You must have a very high visual gradient to have systemization. In philosophy, before Descartes, there was no *system*. Plato had no *system*. Aristotle had no *system*. My own interest in studying media is a *systems development approach*. Systems development is a structural analysis of pressures and strains, the exact opposite of everything that has been meant by systems in the past few centuries. *Systems development* is the opposite of *systems* in the philosophical sense. It is concerned with the inner dynamics of the form.[178]

In contrast Cybernetic knowledge (conceived in terms of processes of communication and control) which is included within the broader remit of Dynamical Systems Thinking is a conceptual shift away from the hegemony of the linearity of typographical knowledge to a knowledge that is both self-reflexive and non-linear. It is thus a non-transparent and deconstructive type of knowledge that questions its own limits, nature and relativity in matters regarding ontology and teleology in a manner that typographical knowledge did not.

3.3 Perspective as the Symbolic Form of Typographic Knowledge

It is argued that the visual model for typographical-type systems of knowledge (around which the ongoing discussion has been 'locked-in') is single-point linear perspective, identified by Panofsky as the 'Symbolic Form'[179] of Western Renaissance epistemology. For as a system of

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178 Marshall Mcluhan & G.E. Stearn, 'A Dialogue', in Stearn ed., *Mcluhan Hot and Cool*, (Penguin Books, 1967), pg. 333

179 In addition; Goldstein's position in *The Social and Cultural Roots of Linear Perspective* takes a Marxist perspective (on arguments investigated by Lowe, Eisenstein, Febvre and Martin, Jay et al.) that single point linear perspective is the 'symbolic form' of the new social ordering of capitalist configured social relations;

representation Linear Perspective is, like Typographical Knowledge: objective, linear and transparent.

In *Perspective as Symbolic Form* Panofsky draws a specific interconnection between two systems of representation; Art and Epistemology. He does this by establishing a specific link between the representative systems of art and images and the psychic systems of human rationality. Thereby Panofsky can argue that art (in this case focusing on the representative system of linear perspective in particular) is the symbolic form of knowledge and *hence that both can be read in terms of human knowledge and rationality.*[180] Thus, for Panofsky, the fact that Renaissance pictures look a certain way (and are organised according to the representative system of single-point linear perspective) can be explained by the way Renaissance painters looked at the world, or (from a systems-theoretical perspective) *the way in which the world was observed by the Renaissance psychic system.*

In *The Origin of Perspective* Damisch calls for a rigorous understanding of perspective to be achieved through a thorough application of the structure of *Symbolic Form*[181] If, Damisch argued,

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that "the relationship between linear perspective and the new cosmology of the Renaissance is one of parallelity since both are different representations of an emerging social structure, namely, modern capitalism," and that "the whole process involves the breakdown of the organicist thinking of feudal society through the development of bourgeois production relations in which man and nature become the objects of active exploitation, so that man in commodity production is no longer a part of nature but its active and aggressive exploiter." See Goldstein, *The Social and Cultural Roots of Linear Perspective*, (MEP Publications, 1988); pg. 18

180 Hence Panofsky's faith in Humanism upon which his whole system rests and this is that there is a shared human rationality between the past and the present which allows for the successful reconstruction of the past in the present through the tri-partite scheme of the iconological method. There is a whole academic industry providing discussion on the limits (and strengths) of Humanist Art History.

181 Damisch took this reading of the of a system of representation, like Panofsky, from Cassirer's conception of the Symbolic Form. Holly has also provided a full discussion of Panofsky's indebtedness to Cassirer's conception of Symbolic Form

perspective is a symbolic form then we can't understand its meaning through the trivial task of semiologically decoding the pattern and organisation of its representational schema in order to discover the semiotic code (and thus decode it). Instead he proposed that symbolic form expresses a more profound observation regarding the configuration of the social and psychic systems which allow for its possibility. Thus it should:

> Not be reduced to a history, specifically to a history of those particular forms that are language, myth, art and science [and therefore] the question of their unity, tendentious at the very least, must be raised continually as a fundamental preoccupation of reason, in [an] expansive sense.[182]

Therefore the symbolic form of a system of representation (and the network of relations of which it is constituted) can be identified at the level of structure and configuration of that system which, in turn can be re-translated (not literally) as an identifiable coherence (or 'mutual articulation') of the system itself. This statement comes with the caveat that this coherence at the level of the system does not function as part of a structuralist analysis of a pre-discursive order but instead expresses conditions of internal coherence and correspondence of the discursive

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in; 'Panofsky and Cassirer', *Panofsky and the Foundations of Art History*, (Cornell University Press, 1984), pg. 114 ff.

182 Damisch, *The Origin of Perspective*, trans. Goodman, (MIT Press, 2000). "As Cassirer asserts, the operation of the sign is indistinguishable from the very principle of consciousness, which implies that nothing can be posited by it that does not refer to something else, that does not need supplementary mediation. 'Only in and through this representation does what we call the p*resence* of the content become possible.' [Cassirer, Philosophy of Symbolic Forms, vol. 1] It is still necessary, if one is to speak of symbolism as it is currently understood, for this representation, operating as it does like a kind of mis-en-scene or natural scenography - its signifying power being antecedent to the position of any specific sign - to be caught up in a network of relations that conforms to the principle of constitution, which in turn makes its mark on all its productions. In this last analysis the sole purpose of 'symbolic forms', their sole product, is just this: the conquest of the world as representation." Pg. 9

system by which it has been identified. Thereby, in eschewing the structuralist, and semiotic model of the structure of symbolic form, the system is revealed not to be structured upon a foundationalist relation of discreet cause and effect between the base and superstructure of either a social system or a language system to be decoded. Instead it consists of a non-linear network of interrelated factors with elective affinities.

Panofsky argued that the system of Renaissance perspective, as it was systematised by Alberti in 1435[183] is conceived in such a way as to guarantee that it is an objective system of representation. It is an:

> Infinite, unchanging and homogenous - space, this central *perspective* makes two tacit but essential assumptions: first, that we see with a single and immobile eye, and second, that the planar cross sections of the visual pyramid can pass for an adequate reproduction of our optical image.[184]

This makes it congruent with typographic qualities of objectivity, linearity and transparency.[185]

As is demonstrated by the image from *Perspective as Symbolic Form* Renaissance perspective is conceived on the plane of artistic representation according to a system of straight lines. Panofsky argued that this is unfaithful to perception because it straightens the natural curve of the eye and thus the naturally curved image which is projected onto the back of the

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183 Alberti, *On Painting* (1435), trans. Grayson, intro. Kemp, (Penguin Books, 1991).
184 Panofsky, *Perspective as Symbolic Form*, trans. Wood, (Zone Books, 1991) pg. 29.
185 Bryson has described the epistemological significance of the model of perspective in similar terms.
"[the renaissance viewer takes up the position] in relation to the scene that is identical to the position originally occupied by the painter, as though both painter and viewer looked through the same viewfinder on to a world unified spatially around the centric ray, the line running from viewpoint to vanishing point... At the picture plane, the two cones intersect; which is to say that the single vanishing point marks the installation within the painting of a principle of radical alterity, since its gaze returns that of the viewer as its own object; something is looking at my looking." Bryson, *Vision and Painting*, (Yale University Press, 1983) pg. 104 ff..

retina (and hence the form of the data which is presented to the psychic system): "exact perspectival construction is a systematic abstraction from the structure of this psychophysiological space."[186] To illustrate this Panofsky compared Renaissance with Greco-Roman perspective which is curvilinear and thus, he argues, more true to the conditions of actual perception.[187] Renaissance perspective, on the contrary, in being unfaithful to perception provides a rational and systematic order to subjective experience which allows for its representation according to a particular, rational system and thus for its reproduction and subsequent re-translation by the viewer *using that same, shared rationality*. In turn this rationality is intended to ensure the objectivity of the system.

For Panofsky Renaissance perspective is the most effective and rational way of achieving this intelligible and thus communicable system of representation in the sphere of artistic representation. This is because in its balance between a subjective and objective viewpoint it provides a consistent and transferable system which can be recognised and hence translated universally.[188] Thus, he argued, it is the rationality of linear perspective which allows for representation according to rational rules in

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186 Panofsky, *Perspective as Symbolic Form*, trans. Wood, (Zone Books, 1991) pg. 30.

187 'Because it conceived of the field of vision as a sphere [and here Panofsky makes a footnote reference to Riegl's *Late Roman Art industry*], antique optics maintained, always and without exception, that apparent magnitudes (that is, projections of objects onto that spherical field of vision) are determined not by the distances of the objects from the eye, but rather exclusively by the width of angles of vision.' From Panofsky, *Perspective as Symbolic Form*, (trans. Wood,) (Zone Books, 1991) pg. 35.

188 "In a sense, perspective transforms psychophysiological space into mathematical space," which Panofsky contrasts with antique perspective which is defined as subjective and "curved". "Antique perspective is thus the expression of a specific and fundamentally unmodern view of space... [and] furthermore the expression of an equally specific and unmodern conception of the world." Panofsky, *Perspective as Symbolic Form*, (Zone, 1991)

which things may be read by others in the same way by virtue of a shared rationality between humans.

For Panofsky, linear perspective is a normative system of representation because it systematises perception according to the conception of geometric and infinite space orientated around the dual poles of the perceiving subject and the vanishing point at infinity, in order to make it publicly communicable according to universally recognized rational laws (as opposed to subjective feelings). As an emblem of the systems of typographical knowledge Renaissance, straight line, *linear* perspective locates the psychic system at the centre of a system which represents the world according to a systematic and rational system; it thus illustrates the iconography of *objectivity*.

Perspective is related to transparency because it requires the negation (in the phenomenological sense) of the material of production. Thus stylistic or artistic choices made in the application of methods of perspective space construction, in much the same way that Alberti's conception of the perspectival painting, in *on Painting* of 1435, was a mimetic 'window on the world' negate and make transparent the picture plane in the act of looking-through (*per-spect/spicere*) it. [189] In this sense it is emblematic of the transparency of typographically configured systems of representation identified above.[190]It is *transparent* in that the canvas, which

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189 For a discussion on this see Holly, *Past Looking*, (Cornell University Press, 1996) chapter 1

190 See Damisch, *The Origin of Perspective*, trans. Goodman, (MIT Press, 2000) pg. For Damisch the implications of this negation are that the implications of a significant (Cassirer-ian) reading of the symbolic form of the art are glossed over (and are themselves, like the 'transparency' of the picture plane negated) by the tendency to assign a superficial meaning to images which fails to contribute to the "philosophy of symbolic forms as well as to history, or better, to cultural anthropology, in the strongest and most radical meanings of these terms."

as the transparent window by which to view the picture space beyond, is phenomenologically negated. Foucault observes this transparency in relation to 'Classical Representation' in his celebrated mediation on *Las Meninas* which begins *The Order of Things*:

> It may be that, in this picture, *as in all the representations of which it is, as it were, the manifest essence*, the profound invisibility of what one sees is inseparable from the invisibility of the person seeing - despite all mirrors, reflections, imitations and portraits. Around the scene are arranged all the signs and successive forms of forms of representation; but the double relation of the representation to its model and to its sovereign, to its author as well as to the person to whom it is being offered, this relation is necessarily interrupted. It can never be present without some residuum, even in a representation that offers itself as a spectacle. In the depth that traverses the picture, hollowing it into a fictitious recess and projecting it forward in front of itself, it is not possible for the pure felicity of the image ever to present in a full light both the master who is representing and the sovereign who is being represented.[191]

From this connection to objectivity, linearity and transparency it allows for the possibility that linear perspective be used as the visual model, or 'manifest essence', of typographical systems of representation and vice-versa, be these epistemological, social or psychic systems.

Thus from within the system of this thesis (and relative to that system) there exists a constellation of multiple vanishing points which include single-point linear perspective as the symbolic form of typographical knowledge. Single-point linear perspective can be restated as the *representation of typographical knowledge* and likewise that typographical knowledge can be observed as the representation, or symbolic form, of single-point linear perspective. This is significant, because as Damisch observes the perspectives of rational, typographic knowledge pervade all

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191 Foucault, *The Order of Things*, (Routledge, 1970) Pg. 16. Emphasis added.

aspects of the social system and thus dictate the ways in which perspective itself has been dealt with by Art History:

> To say that our culture has been and continues to be shaped, informed, and programmed at bedrock by the perspective paradigm is more than mere wordplay - though language requires that perspective not be an object like any other, because, metaphorically speaking, it has a bearing on the conditions determinant of all objectivity, of the perception of objects, from whatever angle or point view they might be considered, in relation to a horizon line and a set distance. Perspective has become so completely integrated into our knowledge, at the most implicit or unconscious level, that today we must turn to another kind of knowledge, erudite knowledge, and embark on an anamnestic project designed to recover it from the technological oblivion into which it has been plunged by ideology.[192]

It is the contention here that a systems-thinking approach breaks from the hegemony of typographical perspectives and in doing so provides the systems of art history with different epistemological technologies and representational systems and thus altered perspectives – or strategies of observation.

4 - Art History as Typographic Knowledge

In this section I argue that Art History as a Humanistic Discipline is also a manifestation of the typographical form of knowledge. Several commentators[193] have identified the profound structural connection between Panofsky's method of Humanist Art Historical reconstruction and

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192 Damisch, *The Origin of Perspective*, trans. Goodman, (MIT Press, 2000) pg. 52.
193 See, amongst others: Jay, 'Scopic Regimes of Modernity,' in *Force Fields: Between Intellectual History and Cultural Critique*, (Routledge, 1993); Holly, *Past Looking*, (Cornell University Press, 1996); Summers, 'Meaning in the Visual Arts as a Humanistic Discipline,' in Lavin (ed.), *Meaning in the Visual Arts: Views from the Outside*, (Institute for Advanced Study, 1995); Crowther, *The Transhistorical Image*, (Cambridge University Press, 2001); Damisch, *The Origin of Perspective*, trans. Goodman, (MIT Press, 2000); Elkins, *The Poetics of Perspective*, (Cornell University Press, 1996); Moxey, *The Practice of Persuasion*, (Cornell University Press, 2001) especially chapter 4.

the artworks it takes as its primary object of research. These arguments share the view that this Art Historical model has the model of visual, linear perspective as the visual diagram for its mode of operation. The argument below follows on from this observation. Having drawn a connection between perspective an typography another step will be taken. This step involves the extending the observation of a structural similarity between Typographic Knowledge and perspective to identifying the same structural similarity between Typographic Knowledge and Humanist Art History itself. To do this it will be necessary to argue that the attributes of Typographical Knowledge shared by single-point, linear perspective are also manifested in Humanist Art History. These attributes are Objectivity, Linearity and Transparency. I will now discuss these characteristics in order.

(i) Objectivity

Art History in its form as 'Art History as a Humanistic Discipline' and *Kunstwissenschaft* is concerned with the objectivity of its claims. In Panofsky's later (English-language) work the tri-partite interpretive schema of Pre-Iconography, Iconography and Iconology was established as a means of ensuring Art Historical objectivity. And the Art Historical methods of the Vienna School and its heritage were informed by the attempts to provide systematic and objective accounts of art and its history.[194]

Panofsky's methodological schema is illustrative of his own Humanism; a Humanism he saw as being paralleled in Renaissance values

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194 For an overview of the Vienna School see Wood, *Vienna School Reader: Politics and Art Historical Method in the 1930s*, (MIT Press, 2003)

and worldview (Weltanschauung).[195] This is also manifested in his investigation into *Perspective as Symbolic Form.*[196] Panofsky specifically links acts of representation (and observation) to rationality and epistemology. It is this interrelationship between the products of a culture and the structures, systems and strategies of knowing peculiar to that culture which once expressed in terms of modes of knowledge provides, for Panofsky, his art historical method with the historical objectivity he requires of it. This point of historical objectivity is his celebrated 'Archimedean point.'[197]

Thus, for Panofsky[198] historical reconstruction of the past is made possible through the particular representative objects (and these might include texts, sculpture, paintings etc.) by which historically specific acts of representation have occurred; and the possibility for this occurs because these acts and objects symbolise the particular epistemological configurations of the psychic *and* social systems which mediated their genesis and existence. In other words, as Podro has observed: "the concern

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195 There has been innumerable accounts and discussion of Panofsky's method. Notable discussions include: Belting, *The End of the History of Art*, trans. Wood, (University of Chicago Press, 1987); Cassidy (ed.), *Iconography at the Crossroads*, (Princeton University, 1993); Fernie (ed.), *Art History and its Methods: A Critical Anthology*, (Phaidon, 1995) chapter 15; Holly, *Panofsky and the Foundations of Art History*, (Cornell University Press, 1984); Mitchell, *Iconology*, (University of Chicago Press, 1986) chapter 3; Moxey, *The Practice of Theory*, (Cornell University Press, 1994) esp. ch.4; Pächt, *The Practice of Art History*, trans. Wood, (Harvey Miller, 1999); Panofsky, *Studies in Iconology*, (Harper Torchbooks, 1939); Podro, *The Critical Historians of Art*, (Yale University Press, 1982); Preziosi (ed.), *The Art of Art History: A Critical Anthology*, (Oxford University Press, 1998) Chapter 3; Steiner (ed.), *Image and Code*, (University of Michigan Press, 1981)

196 Panofsky, *Perspective as Symbolic Form*, (1927), trans. Wood, (Zone Books, 1997)

197 Discussions of Panofsky's concept of the 'Archimedean Point' can be found in Holly, (1984) and Podro, (1980)

198 Holly identifies Panofsky's attitude as one shared with Cassirer who states that philosophy must locate a 'standpoint situated above all these forms and yet not merely outside them: a standpoint which would make it possible to encompass the whole of them in one view, which would seek to penetrate nothing other than the purely immanent relation.' Cassirer, *Language and Myth*, (New York, 1946) cited in Holly, *Panofsky and the Foundations of Art History*, (Cornell University Press, 1984), pg. 127

with rationality as such, and this makes the art of the past available in so far as it can be see in participating in this rationality."[199] The structuring and organisation of the systems of representation of past art in some way reflects the structuring, organisation and nature of the systems of epistemological representation which mediated their existence; hence the link between typographical knowledge and perspective.

(ii) Linear

Art History is Linear in so far as it attempts to construct historically linear teleologies. Even the cyclical models of bud, bloom and decay, observed in both Riegl's and Wölfflin's systematic studies of changes in style, follow a linear development in terms of developments in style being directly related to preceding incidents. Thus although, as Podro has argued, although for Wölfflin and Riegl (in comparison with, say, Schnasse): "teleology no longer offers a *final* vantage point from which to look back at the past," however it does offer a framework for analysis. In other words I argue that the (as opposed to a synchronic model) diachronic model of historical reconstruction is inherently linear.[200]

(iii) Transparent

Art History is transparent in so far as it attempts to be objective and therefore transhistorical. It thus attempts to be transparent as a system of historical representation. As Moxey has argued;

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199 Podro, *The Critical Historians of Art*, (Yale University Press, 1980) pg.??

200 Another way of conceiving this linear historical model is one that is inherently Hegelian. In 'In search of Cultural History,' (In Fernie (ed.), *Art History and its Methods*, (Phaidon. 1995) Gombrich observed the 'dogma' of Hegelianism as inherent in most Art Historical models including Wölfflin's, Riegl's and Panofsky's.

> Used metaphorically [as a means by which to visualise art historical method] perspective can suggest that our access to history is as direct and unmediated as our view through a window.[201]

Damisch has convincingly identified such a tendency toward transparency within the Humanist model of art historical method which operates according to the semiotic paradigm as something to be resisted. In this model everything in an image is a significant detail within a 'code' and all portrays some kind of meaning which may be read by the suitably informed historian. There is thus no account of the extraneous material of support:

> The image is always seen, whatever its constitution as an image, as the prop, the vehicle for any and every signified injected into it from outside, and research still obeys a model of signification, of communication, which leads to a radical distinction between that aspect of the image which belongs to the order of perception, and that which has properly semiotic dimensions. Iconography has its roots deeply entrenched in the metaphysics of the sign.[202]

In summary of the above section I hope to have demonstrated above that Art History (albeit a certain type) is tied by the dual umbilical cords of Humanist rationality and visuality to both Perspective and Typography. In other words that it configured congruently with both artistic and technological systems of communication and representation. What follows below is an argument that discusses further this connection between particular systems of Art History and Typographic Knowledge in order to demonstrate the limits to that type of Art History particularly in dealing with artistic practice after modernism.

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201 Moxey, 'Perspective, Panofsky and the Philosophy of History,' in *The Practice of Persuasion*, (Cornell University Press, 2001) pg. 96

202 Damisch, 'Semiotics and Iconography', in Preziosi ed., *The Art of Art History*, (Oxford University Press, 1998), pg. 240

4.1 Typography and Discursive Memory

Before the discussion moves on to the specific case of Art History some general points should be noted regarding memory within typographic systems in relation to technology.

The technology of the printing press allows for the creation of systems of knowledge which rapidly become, what is called in system-theoretical terms, "locked-in." The self-similarity of subsequent editions of a single text allows for a standardisation of the material produced. In contrast the older technology of the copying of manuscripts by hand can lead to the degeneration of the information between copies as ambiguities in the material were extenuated or misinterpreted as Eisenstein has explained:

> When one places a reconstruction of a Ptolemaic world map derived from the second century A.D. beside a *mappae mundi* designed later on it becomes clear that the statement [by Boulding, in relation to maps that 'early images can always be seen as partial unclear expressions of later more exact images'] needs qualification. Instead of demonstrating 'orderly development,' a sequence of hand copied images will usually reveal degradation and decay. A survey of maps issued during a millennium or more shows how the 'course of recorded history' produced spatial images that cannot be ordered even by taking full advantage of hindsight and present techniques of placing and dating past records... The 'disassociated transcript' that Boulding describes could emerge only after the shift from script to print.[203]

In contrast, the numerous copies of a text produced by a printing press could, theoretically, demonstrate no significant degradation of content between one another. Thus the potential for standard copies of texts to appear was created. The proliferation of self-similar texts had an obvious impact on the production and regulation of knowledge in that

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[203] Eisenstein, *The Printing Revolution in Modern Europe*, (Canto, 1983) Pg. 199

there were more books produced and available thus hastening the "spread of new ideas" (Eisenstein). Again, this provides an example of systems of textual knowledge displaying the behavioural qualities of complex systems such as positive feedback (as further discussed in other chapters of the thesis.) Eisenstein argued that because of the 'fixity' of print (or in the terms of complex systems its irreversibility; or that such systems have memory) the printed word allows for the accumulation of knowledge of a different order to the duplication of pre-typographical knowledge. She observed that when copied there is the potential for manuscripts to mutate over time due to discrepancies arising in the duplication process such as human error (which becomes amplified over successive copies.)

> If one accepts the criteria of 'totality and permanence' to distinguish prior revivals from the Renaissance, then probably the advent of the scholar-printer should be heralded instead. He arrived to cast his Greek types and turn out grammars, translations, and standard editions in the nick of time - almost on the eve of the Valois invasions. Once Greek type fonts had been cut, neither the disruption of civil order in Italy, the conquest of Greek lands by Islam, nor even the translation into Latin of all major Greek texts saw knowledge of Greek wither again in the West. Instead it was the familiar scribal phrase *Greaca sunt ergo non legenda* that disappeared from Western texts. Constantinople fell, Rome was sacked. Yet a cumulative process of textual purification and continuous recovery had been launched. The implications of typographical fixity are scarcely exhausted by thinking about early landmarks in classical scholarship and its auxiliary sciences: paleography, philology, archaeology, numismatics, etc. Nor are they exhausted by reckoning the number of languages that have been retrieved after being lost to all men for thousands of years. They involve the whole modern "knowledge industry" itself, with its mushrooming bibliographies and overflowing card files.[204]

This I argue, has specific implications for Art History.

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[204] Eisenstein, 'Some Conjectures About The Impact of Printing on Western Society and Thought', *Journal of Modern History*, 40: 1(March 1968), pg. 40 ff.

The emergence of typographically configured systems of knowledge meant that these knowledge systems demonstrated the behavioural patterns (such as memory/irreversibility and positive feedback etc.) of systems. With the proliferation of texts references within them become accumulative allowing for a process within knowledge production and consumption which Eisenstein called: "amplification and reinforcement." Such positive feedback and 'locking-in' with regard to a system of knowledge can also be observed in the system of Art History (as a system of knowledge production); and this is discussed at greater length in my concluding chapter where I argue that discourse on art is 'locked-in' around particular paradigms and cultural forms which include a concept of Art itself.

Typographical Knowledge is characterised by systems of knowledge which are taxonomical and accumulative. Such representative structures can be observed to behave *like complex systems*; that is to say that the terms by Foucault discussed them are consistent with the observations of the systems-theoretical definition of complex systems. Foucault wrote:

> In any case the Classical *episteme* can be defined in its most general arrangement in terms of the articulated system of a *mathesis*, a *taxinomia*, and a *genetic analysis*. The sciences always carry within themselves the project, however remote it may be, of an exhaustive ordering of the world; they are always directed, too, towards the discovery of simple elements and their progressive combination; *and at their centre they form a table on which knowledge is displayed in a system contemporary with itself.*[205]

One reason for the occurrence of the systemic processes of memory and positive feedback is that once liberated from the laborious (and as mentioned above, often inaccurate) tasks of copying manuscripts

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205 Foucault, *The Order of Things*, (Routledge, 1974) pg. 74

the processes of the production of knowledge became much more predicated upon principles of accumulation rather than replication (which could now take place mechanically and hence on a faster and more extensive scale). An example to illustrate this would be that Copernicus' observations in *De revolutionibus* (placing the sun at the centre of the universe) were made possible by this accumulation of knowledge culled from a variety of sources. As Eisenstein observed:

> One need not wait until 'a half century after Copernicus' death' to observe the effect of this change [in scientific procedure], for it had begun to affect the study of astronomy shortly before Copernicus was born. Copernicus was not supplied, as Tycho's successors would be, with precisely recorded fresh data. But he was supplied, as Regiomontanus's successor and Aldus Manutius's contemporary, with guidance to technical literature culled from the best Renaissance Greek manuscript collections and, for the first time, made available outside library walls.[206]

This is an example of knowledge behaving like a system by becoming 'locked-in' around particular paradigms. And it is also an example of an observable 'elective affinity' to be observed between technology and epistemology.

Within systems of Typographic Knowledge the role of the scholar changes from one of duplication to one of contribution. The task of the scholar is to contribute to the ever growing information of the system of knowledge which, via processes of positive feedback, accumulates exponentially. It becomes 'locked-in'. Scholars were now afforded more leisure time to pursue investigation linking knowledge production with bourgeois patterns of behaviour as something to be consumed and as

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206 Eisenstein, *The Printing Revolution in Modern Europe*, (Canto, 1983) Pg. 209

something allowed those who could afford the leisure time to pursue independent study.[207]

As is discussed elsewhere in this thesis this principle of accumulation is illustrative of the principle of irreversibility isomorphic to complex systems. According to this principle the memory of a system is articulated in terms of its irreversibility; or in other words, a temporal aspect is added to the analysis, whereby having reached a particular state the system cannot regress to a previous state (such as the VHS/Betamx example outlined in section 2). The argument here is thus; that via systems of typographical memory (books) knowledge became standardised through being reified in print, which in turn facilitated and catalysed and accumulation of information within systems of knowledge, which, in turn, became defined in terms of the accumulation of that knowledge. It is thus argued that when observed from within a systems-theoretical approach the history of systems of western knowledge from about 1450 onwards is a history of a series of irreversible bifurcation points of no-return which are reached and superseded. This reading of history is investigated in more detail with particular reference to the history of the discipline of the history of art in the concluding chapter where it is argued at length that the discipline of art history be observed as a complex system and is thus defined by systems predicates such as irreversibility, positive feedback, systemic memory and so forth.

5 - Contemporary Issues

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[207] Eisenstein, *The Printing Revolution in Modern Europe*, (Canto, 1983) Pg. 240-2

Contemporary technologies bring with them new conceptions of representation; new forms of communication; different ways of thinking; and new perspectives. As Mcluhan has said of the contemporary world:

> We are today as far into the electric age as the Elizabethans had advanced into typographical and mechanical age. And we are experiencing the same confusions and indecisions which they had felt when living simultaneously in two contrasted forms of society and experience.[208]

The perspective provided by the representative and epistemological systems characteristic of the social systems of print culture are configured typographically according to principles of linearity, objectivity and transparency (which presupposes the universal and sovereign human subject of the Cartesian Cogito.)

And thus the shift to post-typographical epistemological systems is another paradigm shift to new systems with different representative capacities and functions. Therefore, in our cybernetic age, with the arrival of new systems of reproduction and dissemination of knowledge the nature of academic research will undergo similar mutations and modifications, to those of the move into the typographic age.

With the emergence of new epistemological systems, with which to order and preserve structures of knowing, different behavioural patterns regarding the way in which that knowing operates also emerge.

In other words new technologies engender different types of knowledge. But what types of knowledge are these?

There is not the time or resources to discuss here more extensively the connections between (post) Modernity/(post) structuralism and

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[208] Mcluhan, *The Gutenberg Galaxy*, (Routledge and Kegan Paul, 1962) pg. 1

technology; this has been covered by many and various commentaries.[209] Instead what is suggested (and demonstrated above) is an attempt to practically apply our technologically configured systems-thinking to a problem central to systems of art history. Thus in an investigation to find the limits and nature of Dynamical Systems Theory we may see how it represents the multiple perspectives of technology, epistemology, typography and perspective. And like a 'magic eye' image, which doesn't represent using single-point perspective but, in which we stare at the 'noise' until we throw our eyes out of focus and stare beyond the image, upon which a three dimensional emerges before our eyes so too will the multiple perspectives of a systems approach emerge from the discussions of this discursive system. Hence, as Foucault observed of his Archaeology of Knowledge, both this chapter and the thesis as a whole is my own attempt to:

> Define this blank space from which I speak, and which is slowly taking shape in a discourse that I still feel to be so precarious and so unsure...
> What, do you imagine that I would take so much trouble and so much pleasure in writing, do you think that I would keep so persistently to my task, if I were not preparing - with a rather shaky hand - a labyrinth into which I can venture, in which I can move my discourse, opening up underground passages, forcing it to go far from itself, finding overhangs that reduce and deform its itinerary, in which I can lose myself and appear at last to eyes that I will never have to meet again.[210]

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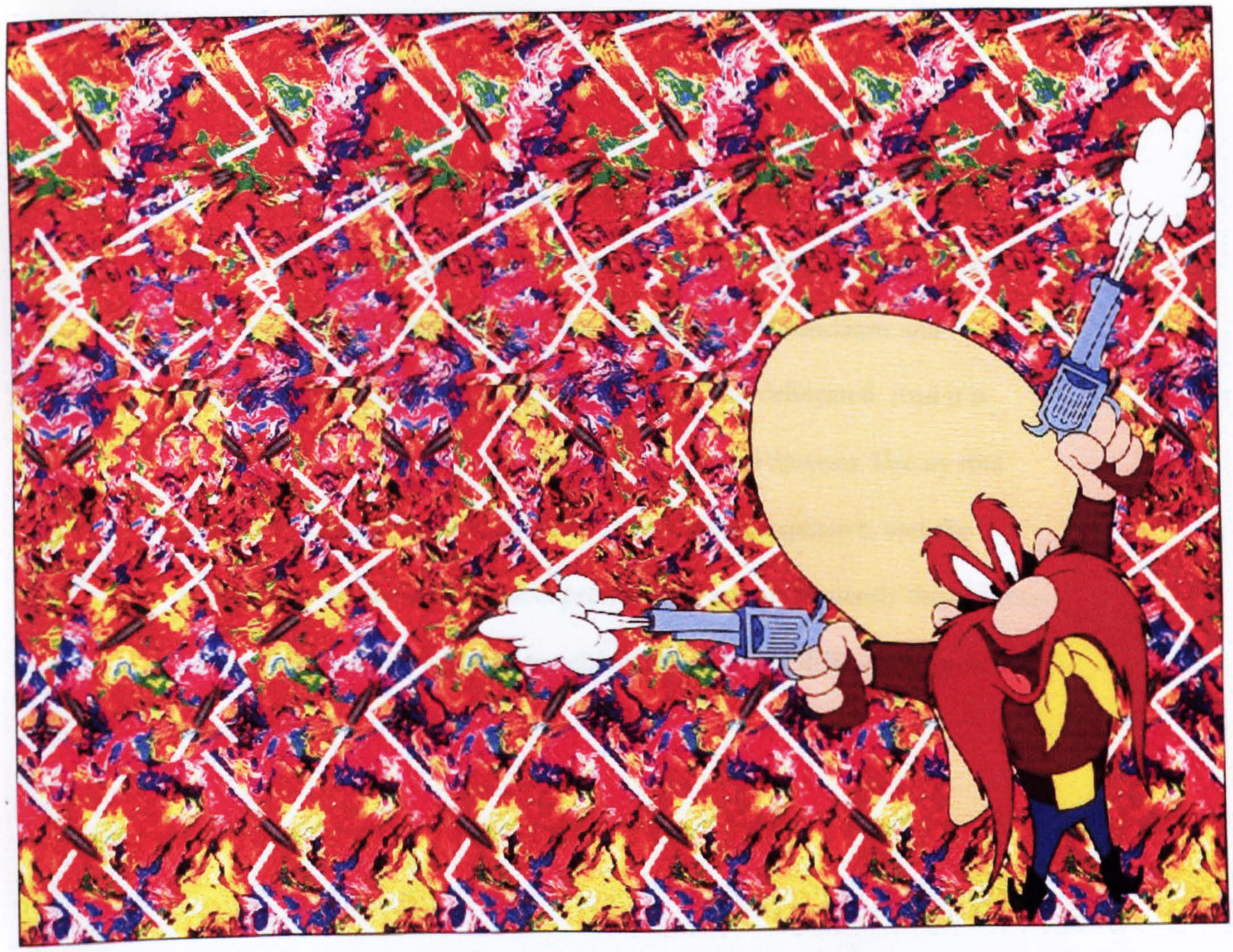
[209] Notable discussions are included within - Cilliers, *Complexity and Postmodernism*, (Routledge, 1998); Rasch & Wolfe eds., *Observing Complexity Systems Theory and Postmodernity*, (University of Minnesota Press, 2000); Levinson, *Digital Mcluhan a Guide to the Information Millennium*, (Routledge, 1999); ed. Hayles, *Chaos and Order - Complex Dynamics in Literature and Science*, (University of Chicago Press, 1991); Kroker A. & Kroker M. eds., *Digital Delirium*, (New World Perspectives, 1997); Aronwitz et al eds., *Techno Science and Cyber Culture*, (Routledge, 1996); Poster, *The Second Media Age*, (Polity Press, 1995); Aarseth, *Cybertext, Perspectives on Ergodic Literature*, John Hopkins University Press, 1997); Ramsey et al eds., *Philosophy and Connectionist Theory*, (Lawrence Erlbaum Associates Inc., 1991)

[210] Foucault, *The Archaeology of Knowledge*, Trans. Sheridan Smith, (Tavistock, 1972) pg. 17



Stereogram, 'Magic Eye', image from

http://yosemite-sam.net/Sam/Books/Sam-Magic-Eye.jpg [consulted 29, May, 2004]

Thus it is that by putting perspective *into* Dynamical Systems Theory, by situating a particular historical situation within its particular circuits and representative networks, the operational functions and idiosyncrasies of that system can be identified and delineated. And it is therefore the putting of perspective *into* Dynamical Systems Theory that allows us to put Dynamical Systems Theory into perspective, and the emergent structures of its critical perspectives are subsequently thrown into focus. In what follows I hope to achieve this with the different objects of observations.

CHAPTER 3:

THE SYSTEMS-THEORETICAL APPROACH AND DISCURSIVE VALIDITY

We may have to relinquish the notion, explicit or implicit, that changes of paradigm carry scientists and those who learn from them closer and closer to the truth.'

Thomas Kuhn, *The Structure of Scientific Revolutions, (1962)*

The displacement of the idea that facts and evidence matter by the idea that everything boils down to subjective interests and perspectives is, second only to American political campaigns, the most prominent and pernicious manifestation of anti-intellectualism in our time.'

Larry Laudan, *Science and Relativism (1990)*

There is no need for these hypotheses to be true, or even to be at all like the truth; rather one thing is sufficient for them... that they should yield calculations which agree with the observations'

Osiander *Preface to Copernicus' De Revolutionbus*

Introduction

The primary function of any system, be it ecological, biological, economic *or discursive*, is to survive.

In order to survive within a competitive environment all systems must adapt and evolve.

This has specific implications for the systems of Art History. Themselves discursive systems, they must also adapt and evolve in order to survive within the competitive environment of the contemporary epistemological and academic climate. For they face the dual threat of both the challenge from outside their borders of the post-structural critique of authority and the internal challenge of the post-modern artistic practice.

The key to the survival of discursive systems, including those of art history, lies in their legitimacy. It is ensured by their plausibility and by their authority. They must become 'locked-in' and thus accepted within academic and social systems.

In what follows I will discuss how the discursive system of Art History is implicated in this systemic 'will to survive.' The argument of this chapter runs as follows:

1 – Since its conceptual foundation as an autonomous academic discipline, Art History has sought to ensure its legitimacy and validity.

2 - Dynamical Systems Theory is a discursive system that can account for its own legitimacy and validity.

2.1 - The truth claims of Dynamical Systems Theory are relative to the discursive system of Dynamical Systems Theory; that is they are not transcendent or metaphysical truths. However the truth claims of Dynamical Systems Theory do have a validity relative in so far as the claims are plausible and consistent.

2.2 Dynamical Systems Theory produces a 'truth' which is consistent with the terms and operations of its own system. In other words Dynamical Systems Theory can provide the conditions for its own validity and an account of these conditions *on its own terms.*

3 - The discursive systems of Art History can adapt, evolve and hence survive by adopting a systems-thinking approach. This enables Art History to ensure its legitimacy and validity, and thus to re-invigorate its Modernist project.[211]

This chapter is, then, about what claims to 'truth' a systems-thinking approach has with regards to how this effects its application to Art Historical problems. This discussion is further informed by the debate regarding the (dis)continuity between Modernism and Postmodernism. I

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211 As is discussed at length in other parts of the thesis the adoption of new vocabularies is essential if the discursive systems of Art History are to successfully account for the complex issues engaged by art *after* Modernism.

argue that a Systems-Theoretical approach is discontinuous from Modernist discursive approaches to knowledge production which include the claims and methods of 'Art History as a Humanistic Discipline.'

1 - Art History and The problem of Scientific Validity

There has never been one homogenous art historical method. Instead, since their conceptual foundation in the 19th Century, the systems of art history have employed an adaptive strategy by means of which they can be and remain able to confront the persisting issue of how to write about past events with any legitimacy or authority. Panofsky addresses precisely this adaptive strategy when he says:

"Finally the results have to be classified and coordinated into a coherent system that makes sense…" and a process by "which the historian may grasp reality by detach [ing] ourselves from the present."[212]

Panofsky's method exemplifies the quest for objectivity within the Germanic tradition of art history understood as a systematic or scientific strategy, (or *Kunstwissenschaft* as opposed to the narrative approach of *Kunstgeschichte.*[213]) According to Panofsky *Kunstwissenschaft*:

> Demands that the objects of its study must be grasped with necessity and not merely historically. A purely historical examination whether it goes first to content or to the history of form, elucidates the phenomenal work of art only by reference to other phenomena, it does not have any higher order knowledge on which to ground itself: to trace back to the particular iconographic representation, derive a particular formal combination from a typological history, … is not to fix it in its absolute place outside its own sphere of being, it is to remain inside the total complex of interconnected appearances. Even the longest 'development series'

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212 Panofsky, 'Art History as a Humanistic Discipline', In Fernie (ed.,) *Art History and its Methods*, (Phaidon, 1995)

213 see Sedlmayr's manifesto on the theoretical method of Art History, 'Towards a Rigorous Study of Art,' (1931), in Wood (ed.), *The Vienna School Reader; Politics and Art Historical Method in the 1930s*, (Zone, 1999)

> necessarily place the line within the limits of the purely historical complex.[214]

The establishment of a systematic strategy is to guarantee the necessity that Panofsky conceives in terms of his notion of the *Archimedean Point.*[215] It refers to the point of critical and historical objectivity from which to view the past in order to be able to avoid projecting ones own culturally and historically specific values back onto it. The aim and purpose of art history is thus to investigate art works in order to: "determine their absolute situation and significance from a fixed *Archimedean point* outside the art work's own sphere of becoming."[216] And it is by avoiding the falsifying projection of ones own subjective values that a critical stance can be established within the descriptive system of art history and its historical 'truth' can be ensured.

The same desire for veracity and validity in the systematic study of art (*Kunstwissenschaft*) can be also be observed in Wölfflin's 'Art History without Names'[217] in which the formal, and thus empirical, qualities of the work of art are used as the transhistorical[218] criteria for differentiation and

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[214] Panofsky, 'The Concept of Artistic Volition', Trans. Northcott & Snyder, *Critical Inquiry*, 8, (Autumn 1981), Pg. 17-33

[215] Holly (1984) further notes that, "how the term 'Archimedean Viewpoint' became a phrase at issue in art historical theory is not known, but we can find Worringer using it as early as 1907 in *Abstraction and Empathy: A Contribution to the Psychology of Style*, trans. M. Bullock New York, 1953), 4," pg. 211, fn. 36.

[216] Panofsky, 'The Concept of Artistic Volition', Trans. Northcott & Snyder, *Critical Inquiry*, 8, (Autumn 1981), Pg. 17-33 [emphasis added]

[217] or 'kunstgeschichte ohne namen' see, Wölfflin, *Renaissance and Baroque*, (...?)

[218] Holly observes, in relation to Wölfflin's method, that this demonstrates a: 'concern with validity in interpretation [which] was itself an offshoot of the positivist theory of scientific validity, which contended that truth is independent of the observer or researcher who discovers it,' (Holly, Panofsky and the Foundations of Art History, Cornell University Press, 1984) pg. 51).) But it can also be seen to be equally a result of the post-Kantian climate of philosophical modernism and a systematic and self-reflexive approach to epistemology in order to establish a veracity and validity to knowledge. This two tendencies were combined in Wölfflin's adoption of a Systematic Strategy and the 'box of

evaluation. This proved an attractive adaptive strategy because, in the words of David Summers:

> The technique of formal analysis which grew up with the discipline of art history seemed to provide a sturdy bridge between what we see and what we say, a secure metalanguage to any art whatever.[219]

Gombrich attempted yet another strategy to establish the objectivity of his art historical method, namely that of adopting scientific methods and vocabularies. His courting of certain scientific methods, in particular biology and psychology, as a means of verifying his observations is best understood as his attempt to establish an *Archimedean point.* Gombrich thus models his art historical style after the principles of scientific discourse, a strategy which is also adopted by the project of this thesis. Through the use of scientific discourse Gombrich therefore provides a precedent for my own application of systems-thinking (which initially emerged from scientific and mathematical discourse) to certain art historical issues.

Throughout Gombrich's work we find various examples of his engagements with the limits of the objectivity of the practices and methods of art history. Bakôs has observed that, as the 'Vienna School's 168th Graduate,' Gombrich identified[220] with their art historical approach because

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tools'(Fernie) of the 5 pairs of stylistic analysis as an attempt to provide a neutral and thus 'objective' language of formal style.

[219] Summers, ' "Form", Nineteenth Century Metaphysics, and the Problem of Art Historical Description', *Critical Inquiry* 15, (Winter 1989), pg. 372-93

[220] It should however be noted that whilst alive Gombrich himself remained skeptical of such a teleological (indeed Panofskian) reading of his own intellectual development and having been identified by Bakôs as an inheritor of the intellectual tradition of the Vienna School replied; "I am all the more struck by the fact how rarely it may be possible to reconstruct a sequence of historical events from a few scattered sources. For inevitably I know more about my intellectual development than you could possibly find out from my writings... But frankly, I don't think it matters to what extent I belong to the Vienna school or any other school, of course we all absorbed views and problems from our teachers, but my present interests lie on a very different plane, as any reader of my writings (and

there was a "common denominator as the belief in art history as a science."[221] Wood described the ethos of the Vienna School as follows:

> The most successful and at the same time most disastrous extensions of Riegl's *Weltanschauungsphilosophie* [which was] indeed carried out by his own immediate successors and students, including Max Dvorak, and above all Hans Sedlmayr, Guido von Kaschnitz-Weinberg, and Otto Pächt, the core of the so-called Second Vienna School. They sought to drive Riegl's structural analysis farther along its synchronic axis by refining and elaborating the categories of the initial pictorial analysis. Their ambitions were superbly ascetic. The latent structural principles of the work would alone yield the insight into the world that produced that work.[222]

The attribution of Gombrich's position to the Vienna School is, to a certain extent, informed by his own enthusiastic embrace of the Positivism of Popper with whom he had a particular social and intellectual affinity via the Vienna Circle. Gombrich said of one of his more celebrated works; "I should be proud if Professor Popper's influence were to be felt everywhere in [*Art and Illusion*]"[223]

It was specifically Popper's synthesis between the processes of historical and scientific verificationism (and falsification) and his scepticism toward Marxist and Psychoanalytical 'Pseudo-sciences'[224] that Gombrich found so attractive.

Thus, like Popper, Gombrich too attempts to provide an objectivity for discourse, (in his case art history) by affecting a synthesis

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possibly of my future writings, if I live so long) will be able to judge. I am sorry I have had to be so outspoken, but while I happen still to be alive, I must 'put the record straight'" in *Gombrich on Art and Psychology*, ed. Woodfield, (1996)

[221] Bakos, 'The Vienna School's 168th graduate', *Gombrich on Art and Psychology*, ed Woodfield, (1996)

[222] Wood, 'Introduction', Panofsky, *Perspective as Symbolic Form*, trans. Wood, (Zone, 1991) pg. 10.

[223] From the introduction to Gombrich, *Art and Illusion*, (ref. req.)

[224] See especially *The Logic of Scientific Discovery*, 1959; *The Open Society and its Enemies*, 1945 [in which he equates Plato and Marx's philosophical systems with totalitarianism and thus tacitly with the rise of Nazi-ism] and *The Poverty of Historicism*, 1957 [which was an attack on legacy of Hegel]

between art history and science. According to Gombrich, cultural history requires the invocation of the world of physics (verifiable in the Popperian sense) rather than of the speculative world of cultural metaphysics:

> As Historians we have learned to use the word 'explanation' with caution. The scientist can test his explanations by a systematic variation of conditions in experiment, the historian obviously cannot. But this need not prevent him from rejecting spurious explanations such as "the evolution of mankind" or the "spirit of the Greeks" and searching instead for conditions that would make the adoption of one or the other way of rendering nature intelligible. It is precisely because mankind can hardly have changed in the period which separates us from the archaic Greeks that we are entitled to expect these conditions still to be intelligible if we ask the simple question of how the function of an image will influence its form.[225]

The example of Gombrich's 'scientific method' has been used here to provide a precedent for my own application of the scientific method and vocabularies of systems-thinking as an interpretive method for Art History. However, as is argued below, this account needs to be balanced with the recognition that within the current social, academic and epistemological climate the appeal to truth by scientific discourse has been called into question. As a result of this they might not necessarily be able to provide us with a fixed critical point with credibility. The problem of verification remains. Thus it is proposed that the *Archimedean Point* of objectivity desired by Panofsky, (who expected the problem to be solved through a shared Human rationality, in a neo-Kantian sense) and Gombrich (who attempted to address the problem through the applied rational objectivity of science) needs to be revisited by art history. This thesis revisits this issue through a systems-theoretical approach.

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[225] Gombrich, 'Reflections on the Greek Revolution', *Art and Illusion*, (Phaidon, 1960)

In the next section, on Systems-Thinking and relativity, the truth claims of Dynamical Systems Theory will be discussed in further detail.

2 - Systems-Thinking and Relativity

'God has put a secret art into the forces of Nature so as to enable it to fashion itself out of chaos into a perfect world system.' - Immanuel Kant[226]

'11:15, restate my assumptions: 1. Mathematics is the language of nature. 2. Everything around us can be represented and understood through numbers. 3. If you graph these numbers, patterns emerge. Therefore: There are patterns everywhere in nature.' -

Maximillian Cohen

The plot of Darren Arrononfsky's 1997 film *Pi* (tagline - *faith in chaos*) is driven by New York mathematician Max Cohen's obsession with a formula hidden in the chaos of the universe. When he stumbles across the 'System' behind nature he finds himself subject to the dangerous attentions of people, such as stock-market traders and scholars of the kabala, who want to find out what he knows about the 'truth.'

This fictional plot illustrates nicely the quasi-mystical quality of some claims that have been made in the name of Systems-Thinking. It has been suggested that, like Max Cohen, we are on the edge of discovering what was formerly considered the unknowable and transcendent order of

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[226] Kant, *Universal Natural History and Theory of the Heavens*, [trans. Jaki], (Scottish Academic Press, 1981)

the world *in itself* – the 'perfect world system.' According to this line of thought there are systems and structures which are divine forces of nature controlling all natural processes according to simple rules, lying in wait in the world to be disclosed. The hopeful assumption is that as soon as these rules are uncovered, the true nature of Kant's 'perfect world system' will also be revealed. In the light of such hopes, Coveney and Highfield, make the following somewhat overstated claim for the systems-thinking approach to knowledge:

> Today, those who pursue the study of complexity are followers of a secret art in which the colour, form and motions of the universe are painted in atoms of logic. And, like their post-Impressionist fore bears, these logical pointillists expect that a greater whole - the essence of the world - will emerge from the discreet elements of their mathematical code.[227]

Examples of such kind show how systems-thinking is often perceived to harbour a faith in discovering a "greater whole - the essence of the world", the faith that a systems approach can provide a unified 'theory of everything'[228]and that thereby it is theoretically possible to find the mathematical patterns and algorithms which dictate the complex systems which underlie the world.[229] In Chaos Theory for example we find the belief in an order behind chaos, and in Complexity Theory the assumption that complex systems are self-organising and thus may be self-conscious. Emerging from this is a new spirituality based on what may be

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[227] Coveney, P., and Highfield, R., *Frontiers of Complexity*, (Faber and Faber, 1995) pg. 19

[228] see Barrow, J., *Theories of Everything: The Quest for Ultimate Explanation*, (Oxford University Press, 1991) and *Pi in the Sky*, (Oxford Unveristy Press, 1992)

[229] Such tendencies are exemplified by the quasi-religious *Gaia Theory* which argues that there is a ghost in the machine of the world. For a demonstration of *Gaia theory* by one of its proponents see Lovelock, *The Ages of Gaia*, (Bantam, 1990). There is also a varied commentary on aspects of the theory (taken from proceedings of a conference, organized by the American Geophysical Union in San Diego, 1988) in Schneider, S., (ed.), *Scientists on Gaia*, (MIT press, 1991)

loosely called a Systems approach. This is exemplified in the following quote from Paul Davies:

> The very fact that the universe is creative, and that the laws have permitted complex structures to emerge and develop to the point of consciousness – in other words that the universe has organised its own self-awareness – is for me powerful evidence that there is *something going on* behind it all. The impression of design is overwhelming.[230]

This 'spiritual turn' has proved attractive to both scientists and non-scientists alike as Erik Davis has noted with specific reference to Systems-Thinking in *Techgnosis* his discussion of 'myth, magic and mysticism in the age of information'. He says:

> The systems paradigm argues that similar patterns of behaviour underlie widely different dimensions of the real, from gadgets to galaxy clusters to games people play. In seeking to pin down this 'pattern that connects,' systems thinking has also seduced many non-scientists restlessly seeking a new frame for the big picture... the flowers of West Coast "holistic thought" in many ways sprouted from this cybernetic matrix.[231]

Systems theory is, therefore, often seen as the inheritor of a Metaphysical search for absolutes sought after by science, philosophy and theism alike. However it is argued here principles of a Systems Thinking approach *need not* be understood as part of a higher 'truth.' Instead they *should* be understood as extremely useful heuristic devices. This thesis uses the principles of systems-thinking to this purpose only and brings them to bear upon certain art historical debates.

2.1 Systems-thinking and the threat of relativism

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230 Paul Davies, *The Cosmic Blueprint*, (Heinemann, 1987), pg. 203. Paul Davis has in other books such as *God and the New Physics* explored the relationship between science and religion.

231 Davis, E., *Techgnosis*, (Serpents Tail, 1998) pg. 90

The acknowledgment of the relativity of the truth claims of both Dynamical Systems Theory and Art History can itself be placed in a historical context. Dynamic Systems Theory is a contemporary theory which has developed over the last forty years. Its emergence is thus synchronous with a more generally observed restructuring of social systems. Such restructuring has involved the questioning and the reconfiguration of the following systems (amongst others): linguistic systems (post-structuralism,) the systems of knowledge (deconstruction,) economic systems (the cultural logic of late capitalism,) technological systems (the communications revolution,) contextual systems (theories on the end of history,) and finally political systems. Due to this synchronicity Dynamical Systems Theory must reflect such social, political and epistemological paradigm shifts in order to be able to ensure and demonstrate the validity of the claims it makes about the world in which this shifts have taken place; in other words so as not to appear anachronistic.

The post-modern relativist attitude now pervades many aspects of academic and intellectual life and has specific implication for both Dynamical Systems Theory and art historical discourse. It has been identified (for example by Lyotard in *The Postmodern Condition*) as a contemporary attitude characteristic of the organisation of social relationships in late-capitalist society. In terms of systems-thinking it can be understood as operating via processes of positive feedback within the academic systems of late capitalism (which have had a cumulative effect for the last forty years) in which academics have become 'locked-in' around the principle of post-modern skepticism. As Sokal and Bricmont observe, this

had a 'knock-on' effect to all disciplines (not least scientific disciplines where Systems-Theory is mostly practised) that used to have a well-deserved reputation for being hermetically sealed away from the vagaries of fashionable conceits. Sokal and Bricmont critically dismiss such skeptical tendencies of relativism in what they regard as:

> A potpourri of ideas, often poorly formulated, that go under the generic name of 'relativism' and are nowadays rather influential in some areas of the academic humanities and social sciences. This relativist *Zeitgeist* originates partly from contemporary works in the philosophy of science such as Thomas Kuhn's *The Structure of Scientific Revolutions* and Paul Fayerabend's *Against Method*, and partly extrapolations of these philosophers' work by their successors. (There are of course many other sources of the relativist *Zeitgeist*, from Romanticism to Heidegger, but we shall not deal with them here.)[232]

Sokal and Bricmont warn against the degenerate potential of what they diagnose as the pernicious 'relativism' of 'contemporary works' on truth claims in scientific discourse in particular (such as those by Kuhn and Feyerabend). They thus identify epistemological relativism with particular orders of knowledge specific to late capitalism. In opposition to Sokal and Bricmont I maintain that acknowledgment of discursive relativity need not mean the erosion of validity.

What has been argued so far is that Dynamical Systems Theory is a contemporary discourse; and must remain so in order to retain the relevance and credence required of it. This is especially necessary if is to function as a viable meta-critique, which is how it is used in this thesis. It is meant to provide art history with a viable method by which to reflect both upon the functions of art and upon its own operation and validity.

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[232] Sokal and Bricmont, *Intellectual Impostures*, (Profile Books, 1998) pg. 50

However as contemporary discursive systems both Dynamical Systems Theory and art history are always already situated within the contemporary skepticism toward metaphysics as outlined above. Lyotard gave this scepticism a description that is immediately relevant to the narrative discourse of art history. At the beginning of his 'report on knowledge' in the post-modern era he states:

> Simplifying to the extreme, I define *postmodern* as incredulity toward meta-narrative. This incredulity is undoubtedly a product of progress in the sciences; but that progress in turn presupposes it. To the obsolescence of the meta-narrative apparatus of legitimation corresponds, most notably, the crisis of metaphysical philosophy and of the university institution which in the past relied upon it. The narrative function is losing its functors, its great hero, its great danger, its great voyages, its great goal.[233]

Whilst not writing specifically about either the history of art or Dynamical Systems Theory the question which Lyotard presents to the arguments of my thesis is that: given that the authority of the meta-narrative has allegedly lost its credibility, how can Dynamical Systems Theory meaningfully and legitimately serve as a meta-critique for art history.

This question becomes especially pertinent one if the concept of system is seen as part of a pre-discursive meta-narrative within what Lyotard calls: "a Newtonian anthropology (such as structuralism or *systems theory*)?"[234] In other words: if Dynamical Systems Theory is merely a technologically sophisticated version of Modernist structuralism, does this short circuit its relevance within the post-structural economies and systems of knowledge within which art history now operates?

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[233] Lyotard, *The Postmodern Condition: a Report on Knowledge*, [trans. Bennington, Massumi], (Manchester University Press, 1984) pg. xxiv
[234] Lyotard, *The Postmodern Condition: a Report on Knowledge*, [trans. Bennington, Massumi], (Manchester University Press, 1984) pg. Xxiv [Emphasis added]

2.1.1 – Lyotard's Challenge to the Validity of Scientific Discourse

A central theme of Lyotard's argument, in the *Postmodern Condition*, is the problem of legitimacy[235] with regards to knowledge production, regulation and consumption in the post-industrial age. To do this Lyotard here introduces a distinction between (1) narrative knowledge and (2) scientific knowledge.

Narrative knowledge, Lyotard argued, is connected to forms within narrative systems: "Narration [and narrative] is the quintessential form of customary knowledge in more ways than one,"[236] and according to him there is a sociality to language systems and the meanings which emerge from them. At this level, such social 'language-games' have a normative function in that the meaning and legitimacy of such games relies upon communicator and those participating in the same system to whom the message is communicated. A feature of Postmodernity, Lyotard argues, is a disintegration of the distinctive legitimacy of such social systems of meaning and hence, ultimately of narrative knowledge. He says, "lamenting the 'loss of meaning' in postmodernity boils down to mourning the fact that knowledge is no longer principally narrative."[237]

Scientific knowledge, on the other hand, requires 'denotation'[238] for its legitimacy. This is because it requires an empirically verifiable correspondence to a world of facts which remains outside of the systems of scientific knowledge but which, nevertheless, may be successfully

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[235] See section 2, 'The Problem: Legitimation', pgs. 6-9, *The Postmodern Condition: A Report on Knowledge*, Trans. Bennington/Massumi, (Manchester University Press, 1984)
[236] Lyotard, *The Postmodern Condition: A Report on Knowledge*, Trans. Bennington/Massumi, (Manchester University Press, 1984) pg.19
[237] ibid. - pg. 86
[238] ibid. - pg. 25

represented within those systems. As Lyotard stated: "In this context, then, one is 'learned' if one can produce a true statement about a referent and one is a scientist if one can produce verifiable or falsifiable statements about referents accessible to the experts."[239]

In this respect, Lyotard argues, scientific knowledge is distinct from narrative knowledge in that it relies upon the authority of 'experts' for its legitimacy; and not just upon its repetition and self-similarity within a socially mediated and hence normative language game (as narrative knowledge does): "It is impossible to judge the existence or validity of narrative knowledge on the basis of scientific knowledge and vice-versa: the relevant criteria are different."[240]

Thus, Lyotard claims, whilst scientific knowledge is concerned with legitimacy, with regards to the retention of the 'language game' of denotation alone, narrative knowledge is not concerned with legitimisation via denotation (and empirical correspondence) per se but with self-similarity; that is with retaining an internal coherence within its own language games and systems. When explained in Systems-Theoretical terms this argument proposes that meaning is understood as an emergent property of social systems and is as such represented from within those systems.

It is this tension, between two types of knowledge which, for Lyotard, creates the epistemological crisis of *The Postmodern Condition.* This corrosive skepticism toward knowledge places scientific knowledge, and its denotative activities, in a precarious position. Science, it would seem,

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[239] ibid. - pg. 25
[240] ibid. - pg.86

cannot legitimise itself. According to Lyotard science can't denote its own truth. This is because 'truth' is not something which can in itself be denoted. In other words, because 'truth' is not a biological system or a physical law or a molecular structure 'science', in its denotative capacity, cannot establish any correspondence with it. Therefore not only does science fail to legitimise itself and its own truth claims without recourse to structures of legitimation which are external to it, but it also negates the non-denotative knowledge production of narrative knowledge upon which it must rely in order to appear legitimate within social systems. Lyotard thus suggests that scientific positivism, in attempting to establish a basis for its own truth (denotation) thus negates the truth of those language games and social systems which could provide it with the external legitimacy for its claims.

> Scientific knowledge cannot know and make known that it is the true knowledge without resorting to the other, narrative kind of knowledge, which from its point of view is no knowledge at all. Without such recourse it would be in the position or presupposing its own validity and would be stooping to what it condemns: begging the question, proceeding on prejudice. But does it not fall into the same trap by using narrative as its authority?[241]

If Lyotard's critique of scientific validity is a serious challenge to the legitimacy of scientific discourse in general then this presents a situation regarding the central premise of a systems-theoretical approach which needs to be negotiated in order to ensure its plausibility. This is because the systems-thinking approach is supported by:

(1) the organising principle of the 'system'

and

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241 Lyotard, *The Postmodern Condition: A Report on Knowledge*, [Trans. Bennington/Massumi,] (Manchester University Press, 1984) pg.29

(2) the presumed validity of scientific epistemology.

The virus of incredulity of which Lyotard spoke appears to threaten the present discussion. For it casts doubt over whether the application of the scientific discourse of Dynamical Systems Theory can be meaningfully and legitimately applied to the narratives of art history (in the spirit of von Betalannfy's search for 'isomorphic principles.')

However, as is argued below, unlike scientific discourse as conceived by Lyotard, Dynamical Systems Theory *can* establish its own truth. What's more in doing so it is able to provide an account of its own validity *on its own terms.*

2.1.2 Language, Meaning and Truth

A systems-theoretical account of the conditions of validity displays telling parallels to Foucault's notion of 'truth games' and to Wittgenstein's 'language games.' Wittgenstein playfully undermines a transcendent conception of language and truth claims and proposed, instead, the following:

> We can also think of the whole process of using words in (2) as one of those games by means of which children learn their native language. I will call these games "language games" and will sometimes speak of a primitive language as a language-game.
>
> And the processes of naming the stones and of repeating words after someone might also be called language games. Think of much of the use of words in games like ring-a-ring-a-roses.
>
> I shall also call the whole, consisting of language and the actions into which it is woven, the "language game."[242]

Similarly Foucault's notion of 'Truth-Games' maintains that truth is not an absolute or transcendent entity with pre-discursive existence.

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[242] Wittgenstein, *Philosophical Investigations,* [trans. Anscombe], (Blackwell, 1963) pg. 5 [emphasis added]

Instead, truth is relative to the conditions of its existence in discourse.

Foucault outlined this specifically in *The Archaeology of Knowledge* (with reference to the 'Enunciative Function'):

> The referential of the statement forms the place, the condition, *the field of emergence*, the authority to differentiate between individuals or objects, states of things and relations that are bought into play by the statement itself; it defines the possibilities of appearance and delimitation of that which gives meaning to the sentence, a value as truth to the proposition.[243]

Applying Foucault's arguments[244] to the problem of legitimacy raised by Lyotard, I propose to conceive 'truth' and (hence the validity) of different discursive systems as an expression not of a direct and unmediated correspondence with a world in-itself, a world of unadulterated and pure facts, but instead as a function of the system of knowledge (in terms of its production, regulation, communication and consumption). Truth is therefore an internal feature of particular closed (in the sense that they have coherent boundaries) discursive systems and their coherence.[245]

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[243] Emphasis has been added to allude to the emergent properties of systems of communication.

[244]Foucault identifies discourse as that which is written, said, practiced, taught and learnt within the parameters of a discipline such as medicine or law; it is the matrix of functions which take place within a particular system of representation (a discursive system):
"Whenever one can describe, between a number of statements, such a system of dispersion, whenever, between objects, types of statement, concepts, or thematic choices, one can define a regularity (an order, correlations, positions and functioning, transformations), we will say, for the sake of convenience, that we are dealing with a discursive formation." Foucault, *The Archaeology of Knowledge*, (trans. Sheridan-Smith), (Routledge, 1972) pg. 91. Like the orders of discourse which Foucault analyses and historicizes in his books (such as psychiatry and the mentally ill (*Madness and Civilization*, medicine (*The Birth of the Clinic*) legal and punitive practice (*Discipline and Punish*), science, economics and classification (*The Order of Things*) Sexuality (*The History of Sexuality vols. 1-3*) and his own practice (*The Archaeology of Knowledge*))both Dynamical Systems Theory and Art History are also discursive systems.

[245] Further coherence can be understood as self-similarity within those systems; thus introducing the form of the fractal into the shape of the argument as an allegory for its structure.

It is precisely because there is not one 'truth' about the world understood in terms of a mind and discourse independent reality that truths should be understood as localised concepts; that is as relative and specific to the systems by which they are represented and expressed. It is in this sense that truths and meaning are relative. As Foucault wrote:

> Knowledge is not an epistemological site that disappears in the science that supersedes it. Science (or what is offered as such) is localized in a field of knowledge and plays a role in it. A role that varies according to different discursive formations, and is modified with their mutations...
>
> In any discursive formation, one finds a specific relation between science and knowledge; and instead of defining them in a relation of exclusion and subtraction (by trying to discover what in knowledge is still comprised by its proximity to and the influence of knowledge), archaeological analysis must show positively how science functions in the element of knowledge.[246]

Foucualt's position in relation to discursive practice has a parallel in the position of W.V.Quine the American philosopher and logician who is contemporary[247] to both Foucault and the emerging tendencies of systems approaches/systems thinking. [248]

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[246] Foucault, *The Archaeology of Knowledge*, [trans. Sheridan-Smith], (Routledge, 1972) pg.185

[247] Note that Quine's *Ontological Relativity* appears in 1969 thus sandwiched between the English edition of Foucault's *The Order of Things* which appeared a year after in 1970; and a year after von Bertalannfy's epochal *General Systems Theory* of 1968.

[248] This is a significant historical observation because a central argument to this chapter is that strategies of deconstruction, ontological questioning on analytical grounds and the cybernetic self-reflexivity of systems-thinking all share a common ground of historical context. Some have attempted, (Luhmann and Cillers amongst others) to categorize these numerous contemporaneous tendencies in disparate fields such as sociology, literary theory or meteorology as functioning within the shared space of a general systems approach which unifies aspects of the humanities and the sciences according to certain 'isomorphic principles'. In particular Quine's writings coincide with Foucualt's regarding the metaphysical indeterminacy of meaning and Quine's position can be seen to share a common ground with Foucualt's own skeptical archaeologies of the ontology and validity of particular epistemological and classificatory systems. However, unlike Foucault, Quine worked outwards from a tradition of analytical philosophy exemplified by the Logical Positivism of Rudolph Carnap (and to a lesser extent the English

The key aspect of Quine's thought, as it relates to ontology (and thus its specific application concerning an ontology of systems as I use it here), is outlined in detail in *Word and Object* and *Ontological Relativity*[249]. Quine's argument is that any ontology is relative to the system by which it is categorised and defined. Thus, in particular, meaning is best understood as a property of language rather than as a matter of metaphysics because language is a system by which meaning is categorised and defined. Quine observed:

> Both ontology and satisfaction are matters of reference. In their elusiveness, at any rate in their emptiness now and again except relative to a broader background - both truth and ontology may in a suddenly rather clear and even tolerant sense be said to belong to transcendental metaphysics.[250]

Quine argued that meaning, truth and ultimately ontology are relative to the systems of language; that is they are not dependent upon transcendent or metaphysical structures. A key point of note here is that Quine occupies a position very close to that of the post-structural critique of structuralism. For him the language acts as an agent of legitimisation but is not a structure or a system in so far as it is not a pre-discursive given. Rather, language is a pattern of behaviour:

> Semantics is vitiated by a pernicious mentalism as long as we regard a man's semantics as somehow determinate in his mind beyond what might be implicit in his dispositions to overt behaviour. It is the very facts about meaning, not the entities meant, that must be construed in terms of behaviour."[251]

Language analytical tradition of analytical philosophy as demonstrated by the Logical Positivism of A.J. Ayer).

[249] Quine, *Word and Object*, (MIT press, 1960); *Ontological Relativity and Other Essays*, (Columbia University Press, 1969) and *The Ways of Paradox*, (??????)

[250] Quine, *Word and Object*, (MIT press, 1960) pg. 68

[251] Quine, *Word and Object*, (MIT press, 1960) pg. 27

Such a 'behavioural' notion of language rejects structural accounts that understand language as if it were a solid, physical or structural fact which can be identified and analysed in itself using particular strategies of structuralist analysis.[252] The behavioural patterns of language, which function within particular social systems, give rise to the emergent property of meaning, in turn expressed as internal coherency amongst communications within those particular systems. Meaning, and in particular the meaning of truth, is thus revealed as having a nominal existence as a specific function of behavioural patterns relative to particular social systems of communication.

Quine has further argued that in order to ultimately legitimate the meaning of statements a 'background theory' is required. This 'background theory' provides epistemological and ontological support to the assertion of the statement. It is also subject to relativism and thus also can't be proved outright via recourse to a congruency with an absolute, instead it is relatively congruent to parts of itself. Quine stated:

> We need the background language to regress into. The background language gives [a] query sense, if only relative sense; sense relative in turn to it, this background language.
> In these terms [of the potential for this to cause an infinite regress of meaning] the situation sounds desperate, but it is in fact little different from questions of position and velocity. When we are given position and velocity relative to a coordinate system, we can always ask in turn about the placing and the orientation of axes of

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[252] This is exemplified in the structuralist approach of Saussure and those influenced by him. He wrote: "The sum total of word relations that the mind associates with any word that is present gives a virtual series, a series formed by the memory (a mnemonic series), as opposed to a chain, a syntagma formed by two units present together. This is an actual series, as opposed to a virtual series, and gives rise to other relations. The conclusion I should like to draw from this is as follows: in whichever order of relations a words functions (it is required to function in both), a word is always, first and foremost, *a member of a system*, interconnected with other words, sometimes in one order of relations, sometimes in another." Ferdinand de Saussure, *Third Course of Lectures on General Linguistics* (1910-1911) (Pergamon Press, 1993) [Emphasis added.]

> that system of coordinates; and there is no end to the succession of further coordinate systems that could be adduced in answering the successive questions thus generated.[253]

In summary of the above, and in advance of the next chapter section I conclude that from within the perspective of a Systems-Theoretical approach discourse is able to reflect back upon its own operations. This reflection is made possible by a notion of meaning as a function an internal consistency amongst patterns of language; or, in other words as an emergent property of certain self-similarities which occur within linguistic systems. The relationship, between validation and meaning and the internal consistency of a linguistic system can then, in turn, be applied to Dynamic Systems Theory and its application to Art History in two ways:

(1) Externally. The adoption of Dynamic Systems Theory as a discursive method allows for the identification of language and meaning in the systems-thinking vocabularies of: behavioural patterns, internal consistency and self-similarity.

(2) Internally. Dynamic Systems Theory, as an interdisciplinary strategy, can utilise a hybrid of terms. In doing so it is seen through a combination of Foucault's terms as relative 'Unity' of a 'Discursive Formation' within what Quine has called a relative 'co-ordinate system'. Further, according to its own terms it is itself a dynamic and complex system (with all this entails). *Dynamic Systems Theory can thus recognise and classify itself.* And once classified as a system of discourse it can be seen to have its own behavioural patterns of

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[253] Quine, *Word and Object*, (MIT press, 1960) pg. 49

internal consistency and self-similarity and as such have a claim to meaning (at least on its own terms).

In this respect, unlike the scientific knowledge which Lyotard observed cannot demonstrate its own validity (and this is because it functions via denotation), Dynamic Systems Theory can *observe and represent itself.* It is by virtue of this self-representation that it contains both a description of itself and its own self-reflection within its own theorising; there is no critical blind spot and it is fully self-reflexive. This is something Luhmann observes with regards the universality he proposes a systems approach can bring to his discipline of Sociology:

> A universal theory observes its objects, and itself as one of those objects, as self-referential relations. It does not presuppose any transcendental epistemological criteria.[254]
>
> Systems research is itself a system; it cannot formulate its basic concept so that it would not itself come under that basic concept.[255]

It is by virtue of this self-representation that Dynamical Systems Theory ensures its claim to 'truth' and validity.

2.2 A Systems Theoretical Account of Validity

As Kuhn has observed the acceptance of the relativity of scientific statements need not diminish the validity of those statements. This means that ascertaining the plausibility of the statements produced by a discursive system is still both possible and important. Therefore although 'truth' is identified as a function relative to the system within which it is represented it does not lose its validity.

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[254] Luhmann, *Social Systems*, Trans. Bednarz, Jr. with Baecker, (Stanford University Press, 1995) pg. xlviii

[255] Luhmann, *Social Systems*, Trans. Bednarz, Jr. with Baecker, (Stanford University Press, 1995) pg. 482

As Kuhn has said:

> I agree entirely with the traditional view that [objective factors, including empirical veracity, coherence and correspondence] play a vital role when sociologists must chose between an established theory and an upstart competitor... they provide *the* shared basis for theory choice.[256]

In other words even after the waning of the credibility of Scientific Realism[257] the concept of 'truth' can still function as a regulatory principle within discursive systems. In Leplin's words; even informed by an incredulity toward the belief that there can be a direct, epistemologically

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[256] Kuhn, *The Essential Tension*, (1977) pg. 322

[257] For the classic defence of Scientific Realism as it was presented by Tarski in *The Concept of Truth in Formalized Language* (1956 ?) see Boyd, *Realism and Scientific Epistemology*, (Cambridge University Press, 1985?). A useful introduction to the vast amount of literature can be found in Leplin ed., *Scientific Realism*, (University of California Press, 1984); see also Field, 'Tarski's Theory of Truth', *Journal of Philosophy* 69, 13 (1972) pg. 347-375. The position of *scientific realism* (which accepts and tries to demonstrate the correspondence of statements with the world as it actually is) and the position of *scientific anti-realism* (which seeks to show a discontinuity between discursive statements and the actually state of the world) operates according to the same dichotomy. This is between on the one hand discourse, and on the other extra-discursive entities. So essentially both positions play the same game, with both sides agreeing on ground rules of a binary of opposing entities (the discursive and the extra discursive) but disagreeing upon whether there can be a demonstrable correspondence between the two. The position of scientific realism proposes that there can be a correspondence between statements about the world and the world and that: 'a good model gives an insight into real structure and that the long term success of a theory, in most cases, gives reason to believe that something like the theoretical entities of that theory actually exist.' [McMullin, 'A Case for Scientific Realism', in Leplin ed., *Scientific Realism*, (University of California Press, 1984) pg. 9-36.] The position of anti-realism, on the other hand, identifies the relativity of the claims of scientific discourse, as van Frassen observes, the systems of science will always be weighted and thus not wholly objective: 'Science itself distinguishes the observable that it postulates from the whole it postulates. The distinction, being in part a function of the limits science discloses on human observation, is anthropocentric. But, since science places human observers among the physical systems it means to describe, it also gives itself the task of describing anthropocentric distinctions. It is in this way that even the scientific realist must observe a distinction between the phenomena and the transphenomenal in the world picture.' Van Frassen, 'To Save the Phenomena', *Journal of Philosophy*, (vol. 73, no. 18, Oct. 21, 1976) (A more thorough statement of the case of anti-realism is provided by van Frassen in *The Scientific Image*, (Oxford Univeristy Press, 1980); a commentary on this key text is included among the arguments in: Churchland, *Scientific Realism and the Plasticity of Mind*, (Cambridge University Press, 1979)

sound and empirically verifiable correspondence between systems of discourse and the extra-discursive world, there are still:

> Important uses for concepts possessing the formal properties truth and reference, such as are captured by Tarski's theory of truth; only the concepts we would use would be *theory relative - such as warranted assertability or probability within a system* rather than classical ideas based on correspondence to theory independent of fact.[258]

In the remaining argument of the chapter I will address the ways in which the discursive systems of *Dynamical Systems Theory* (and its application within Art History) adhere to this regulatory function of plausibility. To do this I demonstrate the ways in which the discursive systems of both *Dynamical Systems Theory* and Art History display the iconography of truth in terms of internal and external[259] coherence within the psychic and social system. This will be demonstrated below by showing that 'truth' can be understood as a function of a hierarchy of value systems.

A belief can be held which can be meaningfully said to be justified and therefore 'true' without being validated by metaphysics. When belief is explained in systems-thinking terms (as I do below) it is understood to be validated by a state of coherence within the psychic system. This coherence satisfies the conditions required to produce the state of belief within that psychic system; which is to say that evidentially, empirically and intuitively it satisfies a probability calculus. In turn, this internal state within the psychic system (or, the belief of that psychic system) is validated in terms

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[258] Leplin, 'Introduction', in Leplin ed., *Scientific Realism*, (University of California Press, 1984) pg. 5

[259] Note here the use of 'internal' and external'; 'internal' refers to an internal consistency within a system and 'external' does not refer to an extra-systemic state but rather a state represented in another system. In this case a belief is a function of an internal state in the psychic system which is in turn validated in terms external to the psychic system by an corresponding to an internal consistency within the, larger, social system. And this suggests a normative basis for 'truth' within the social and psychic system.

external to the psychic system, namely through the circuits of authority and norms within the social systems

2.2.1 Truth as Plausibility: The Rejection of Exactness

In order to create the conditions for a statement to be represented as true within the psychic system[260] that statement must appear to be to be true 'in all likelihood.' Thus conditions of probability are introduced. In this respect, with regards to the subjective plausibility of statements, there is the sense that a belief can be held to be true if there is plausible evidence to suggest that the probability of the statement's validity is more likely than not. Stated in its simplest sense, as Pollock and Cruz do, this proposes the seemingly commonsense suggestion that: "A person is justified in believing P if and only if the probability of P is sufficiently high."[261]

At first glance this seems sensible. Just as it is intuitively viable to accept as true what we believe to be in all probability to be the case, so too it seems counter-intuitive to believe what seems improbable. The controversy regarding the application of this simple regulatory principle (that we believe to be true is most probably true) arises from its

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260 "Even after the observation of the frequent conjunction of objects, we have no reason to draw any inference concerning any object beyond those of which we have had experience." David Hume, *A Treatise of Human Nature,* Book I, part 3, Section 12, (Clarendon Press, 1975) pg. 139. Popper also argued that 1000 confirmations of a theory still do not ensure that its 1001st occurrence it will be confirmed; and used the example of Newton's Law of Gravitation which whilst accepted as 'true' for over 200 years was superseded by Einstein's psychics. Popper argued for the fallibility of science which is constructed of *hypotheses* (rather than absolute truths) which may therefore *be falsified* at some point in the future. Thus, for Popper it is the *falsification*, of theories rather than the confirmation of them which is the significant epistemological technology and the scientist should not seek confirmation of hypothesis by experimental activity. On the contrary, he should look for ways in which to disprove them. See Popper, *The Logic of Scientific Discovery*, (Routledge, 1992)

261 Pollock & Cruz, *Contemporary Theories of Knowledge,* (Rowman and Littlefield Publishers Inc., 1999) pg. 101

formalisation. For the quantification of belief and of relative probabilities forces one to misrepresent states as exact probabilities which are by their very nature un-quantifiable, or in systems-thinking terms 'fuzzy'. This conundrum can be approached in systems-thinking terms.

The most celebrated example of this approach (and the example toward which criticisms regarding the limitations of ascertaining a probability calculus for states of belief are usually directed) is the so-called *Bayes Theorem*[262]. Bayes' theorem is a formalisation of the conditions for the belief in the probability of the hypothesis h, in light of both evidence e, *and* context a. This is formulated thus:

$$p(h|e,a) = p(h|a)*p(e|h,a)/p(e|a)$$

It states the proportional correlation between the degree of belief in a hypothesis and the probability of the evidence given for it. Thus given increasing evidence in support of a statement we are more likely to believe in its truth (and vice versa).[263]

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[262] Bayes, Essay Towards Solving a Problem in the Doctrine of Chances, ref. required

[263] "[the theorem gives an] expression for the probability of a hypothesis *h*, if some evidence *e*, is added to antecedent knowledge *a*. The theorem states that the probability of *h* relative to *e* and *a* is equal to the probability of *h* relative to *a* multiplied by the probability of *e* relative to *h* and *a*, and divided by the probability of *e* relative to *a*. This means that evidence improbable antecedently, but likely to obtain if a hypothesis is true raises the probability of a hypothesis most." From Flew ed., A *Dictionary of Philosophy*, (Pan Books, 1979) pg. 38. An example of this is the statement 'pigs can't fly so you need wings to fly' representing a strong belief. Therefore in the highly unlikely case that a flying pig is found then the belief in needing wings to fly is overthrown. This corresponds to Popper's argument that value of a hypothesis surviving a test of validity is proportional to the severity of the test applied to it.

Bayes' theorem is thereby an attempt to formalise rules for our acceptance of statements by reference to their probability. As Worral has explained:

> "The Principles of Personalist Bayesianism are essentially natural extensions of logical principles. The requirement of coherence (that is, the requirement that one's degrees of belief satisfy the probability calculus) is a natural extension of the requirement of deductive consistency."[264]

A major flaw in the Bayesian formulation of the *probabilism*[265] lies in the requirement of a specific mathematical value being calculated for the following:

(i) our initial belief in a hypothesis (*h*) given

(ii) our system of background beliefs (*a* - being the context or antecedent knowledge of the hypothesis) and

(iii) any new evidence presented to the psychic system (e).

These three values are required for the Bayesian equation. This inherent difficulties of such an approach become obvious as soon as one tries to calculate a precise value (between 1 and 0) for any new evidence given to the psychic system. Despite the merit it promises by offering a simple formulation of the correlation between belief and probable evidence, this approach is clearly unrealistic not least because of the skeptical doubts, which form the very foundations of modern philosophy, regarding the validity of sense data in a total epistemological system.[266]

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[264] John Worrall, 'Philosophy and the Natural Sciences', in Grayling ed., *Philosophy 2*, (Oxford University Press, 1998) pg. 229

[265] The term 'Probabilism' is used by Pollock and Cruz (1999)

[266] Further expositions on the strengths and weaknesses of Bayesian epistemology are discussed in - Earman, *Bayes or Bust/ A Critical Examination of Bayesian Confirmation Theory*, (1992 ref.); Chisholm, *Perceiving*, (Cornell University Press, 1957); Howson & Urbach, *Scientific Reasoning: The Bayesian Approach*, (1993 ref.); Kyburg, *Probability and the Logic of Rational Belief*, (Wesleyan University Press, 1961); Kyburg, *The Logical Foundations of Statistic Inference* (D. Rreidel, 1974); Levi, *The Enterprise of Knowledge*, (MIT Press, 1980). They are expounded upon at length by

Thus, the problems with Bayesianism as a strategy for providing a formal expression of a principle of belief arise because of its unrealistic expectation that there can be a refinement or elaboration of the mathematical foundations of the theory which will enable the precise calculation of various degrees of belief and probability. Further, this expectation will, it seems, always be a futile project that requires one to ascertain exact values (probabilities) for natural states and systems states (such as beliefs) which given their dynamic, fuzzy, distributed and thus un-quantifiable nature will always be misrepresented by such a strategy.

The foundational rule of common-sense rationality in Bayesian Epistemology is undermined by its rigid application and reliance upon a binary systems of values (true vs. false.) A further problem arises with regards to a fundamental incongruity between systems of validation and that which they are seeking to validate. This is represented by the incommensurability between:

(i) the formal system of propositional logic in which statements such as:

'All busses are red; a is a bus; therefore a is red'

are by necessity represented within that system as being either completely true or completely false.

And

(ii) the system of empirical validation within which factual statements are made about the world[267]

Carnap, see especially, *The Logical Structure of the World*, (Routledge and Kegan Paul, 1967)

[267] This distinction does not include the Kantian *Synthetic A Priori* (such as mathematical statements).

However, while the demand for exactness has to be rejected, the correlation expressed by the Bayesian formula still holds. Thus the Bayesian equation should be taken not as an axiom to be applied exactly and literally, but instead as an expression of the following general regulatory principle within systems of knowledge:

- A belief is a function of a representation within a particular system which represents that belief as more or less true, or true to a certain but *not necessarily quantifiable* degree.

2.2.2 Systems-Thinking and Fuzzy Truth

In the following I will outline the notion of 'Fuzzy Truth' as employed by Dynamical Systems Theory. Truth is here understood as a 'fuzzy' distributed representation within a particular representational system. It can thus account for its own truth or validity.

The 'fuzzy' truth of systems-thinking acknowledges the distributed nature of truth in both psychic and the social systems. It is thus congruent with the model of distributed representation characteristic of a systems-thinking approach. In other words, given the distributed nature of what is represented, a 'truth' does not require a *simple* correspondence between the representation and what it represents. Instead, this 'fuzzy' correspondence is distributed over a matrix of representation and meaning production. The relevant systems of distribution include both psychic systems of internal beliefs and social systems of normatively validated 'truths.'[268] These are networks within

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[268] One of the criticisms leveled at the Bayesian model of personalist plausibility is that by concentrating upon, and quantifying, states of belief within the individual

which particular connections can be altered or expire without damaging the capacity of the system to represent. Thus the accepted 'truth' of a statement need not correspond to one particular component and its probability calculus. It is instead distributed throughout the representative network.

This distributed or *fuzzy* nature of belief can be demonstrated through its application to Tarski's classic statement of Scientific Realism

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it is over determined by a reliance upon subjectivity of the believing subject and is thus an epistemologically benign form of sollipsism which ignores the public nature of knowledge production and regulation. Fisher provided a well commentated upon dismissal of Bayesian subjectivism in R.A.Fisher *Statistical Methods and Scientific Inference,* Oxford Univ. Press (1925) 'The concept that the scientific worker can regard himself as an inert item in a vast co-operative concern working according to accepted rules, is encouraged by directing attention away from his duty to form correct scientific conclusions, to summarize them and to communicate them to his scientific colleagues, and by stressing his supposed duty mechanically to make a succession of automatic decisions...The idea that this responsibility can be delegated to a giant computer programmed with Decision Functions belongs to a phantasy of circles rather remote from scientific research. The view has, however, really been advanced (Neyman, 1938) that Inductive Reasoning does not exist, but only Inductive Behaviour!' pp. 104-5. However Fisher's methods have also received well documented criticism such as that from Robert Matthews; 'The key stumbling-block to the application of Bayesian inference [is that] to work out the value of Prob(theory | data), we must first establish Prob(theory); that is, we must be able to put some "prior probability" on the theory we are testing. As I shall show later, setting this prior probability is often far less problematic than some critics [such as Fisher] claim: it is rare that there are absolutely no previous findings or plausibility arguments available to constrain our estimate. It remains true, nevertheless, that in those cases where there is a complete absence of any previous results or insight, the prior probability of the correctness of the hypothesis will be based largely on opinion. In short, it will be *subjective.* It is this unequivocal use of subjectivity that has made Bayesian inference so controversial, and has led to such determined attempts to find alternatives. As we have seen, working scientists may routinely use subjectivity when it suits them, but the idea of explicitly incorporating it into the very heart of data analysis remains anathema. But this attitude overlooks a striking fact about the scientific process: that all attempts to rid it of subjectivity have failed. By the usual standards of scientific research, the repeated failure of these attempts would be taken to imply that the basic thesis was flawed... The axioms of probability, via Bayes's theorem, show that subjectivity cannot be wrung out of the scientific process for the simple reason that it is mathematically *ineluctable.* Much as we might want to, it is *impossible* to obtain the value of Prob(theory | data) without having some value for the prior probability Prob(theory)', Matthews, *Facts versus Factions: the use and abuse of subjectivity in scientific research,* based on a monograph for the European Science and Environment Forum, Cambridge, UK, September 1998.

whereby the statement 'Snow is white' is true if and only if snow is white.[269] This statement can be made 'fuzzy'; and in doing so it can be equally valid to say that snow is both white and not white at the same time. The binary between true and false can often prove to be unsatisfactory, and given the distributed nature of representations of truth we can see that often statements may be more or less true in the strict sense yet no less valid, or plausible as a result. To demonstrate the limits of a non-distributed concept of plausibility let us say, for the sake of argument, that we are flying in a hot air balloon and see a pattern of snow from above and decide that it is white, in which case our statement would have a truth value of 1. Upon landing the balloon and getting out we see that the snow still looks white, thus the statement 'the snow is white' still has a truth value of 1. Then we squat down and look at a small patch of snow which is mostly white but some of which has melted and the brown earth below can be seen, things are becoming harder to quantify now but we decide to accept that the snow is mostly white and thus according to a non-distributed concept of truth we must say that the statement 'the snow is white' is true (i.e. that this statement has a truth value of 1). Then we get up really close to the snow, looking at just one bit of it which we see is a mottled colour, therefore at this point the statement 'the snow is white' has a truth value of 0 and at this point in time it has switched to being an untrue statement. Then we get out our magnifying glass and see that the mottled colour of the snow is comprised of many colours.. And so we could continue the microscopic

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[269] See Tarski, *Logic, Semantics, Metamathematics*, (Clarendon, 1956)

level and beyond this to the level of observation of the atomic microscope with each degree of magnification suggesting a different response to the statement that the snow observed in our ever decreasing sample is white. However if we approach this problem with the fuzzy logic of distributed systems rather than the binary logic of truth and falsehood then we could state that the snow is *more or less white* and without having to assert the definitive truth of the statement it still remains a normatively plausible statement.

As Kosko has observed:

> The problem with [Tarski's position] lies in tacking on the 100% certainty factors... the positivist can make a meta-round off and say that this means that this just means that the higher-order statement "*grass is green* is 85% true" is true 100% if and only if 85% of grass is green. This admits the existence of fuzzy-truth value, here the 85% truth score. And we can come back and again fuzzify the whole formula. We can fuzzify any attempt to meta-round off our higher-order versions of the formula. Rounding off lies at the heart of working with symbols and speech. Rounding off compresses information. It simplifies matters and reduces the many to the few, reduces the complex to the manageable. We round off to get by and to get a quick handle on idea and the pieces of our changing world view. We have to simplify to get things going, at least at first. No harm in that. But actions have costs. Bivalence or rounding off trades accuracy for simplicity. When you round off, you pay in truth and accuracy and honesty for what you gain in simplicity and precision and conformity.[270]

As I discuss with regards to a number of systems throughout my thesis (including ant colonies, models of consciousness, the art gallery, the art market and art discourse); in a complex system, which operates according to the structure of connectionism, representation is distributed over that system. It is therefore not centred around any particular part or element of that system. For example memories are not stored as engrammes (actual or

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[270] Kosko, *Fuzzy Logic*, (Flamingo, 1994) pg. 90 ff.

virtual), but are instead distributed throughout the cognitive system. Therefore a distributed system, unlike a linear system, can still function in the event of localised damage. Representations do not have exact and specific values which are fixed (in terms of weights of nodes within a neural net), a specific location within a system or follow specific algorithms.

It is thus argued that strict Bayesianism be replaced with what will be called here 'Fuzzy Bayesianism.' I thereby follow Pollock and Cruz who argue that the Bayesian epistemological algorithm can be rejected without dismissing its overall ethos. What is adopted in its place is a type of reasoning that is inspired by Bayes, yet has no need for strict mathematical quantification. What remains is the simple rule of plausibility and probability upon which Bayes' calculus was founded. In Pollock and Cruz's words:

> The simple rule might be combined with a more sophisticated account of perception and memory without robbing it of the power inherent in its use of probability. And the simple rule would still retain its intuitive appeal in capturing the idea that what we should be doing in the epistemological evaluation of beliefs is choosing beliefs that are probable.[271]

However, this is not to say that the notion of truth employed by systems thinking is restricted to a merely descriptive account and has no potential for predication. Despite an already noted fundamental unpredictability of complex systems, it can still be maintained that the plausibility of a discursive system can involve a capacity for predication is

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[271] Pollock & Cruz, *Contemporary Theories of Knowledge*, (Rowman and Littlefield Publishers Inc., 1999) pg. 102

used in an expanded sense. In this expanded sense predication is

understood as being possible *after* events. Worral has referred to this as a

> non-temporal sense that allows for the prediction of old facts. This may seem like a strange usage - but it is in fact one often adopted both in science and studies of science.[272]

This 'strange usage' is based on a non-linear notion of prediction. This means that patterns of behaviour can be identified as conforming to behaviour of complex systems without requiring the determination of how those systems will behave in the future. The Logical Positivist Moritz Schlick explained this as follows:

> The confirmation of a prediction means nothing else but the corroboration of a formula for those data which were not used in setting up the formula. Whether these data had already been observed or whether they were subsequently ascertained makes no difference at all.[273] [274]

Consequently 'truth' cannot be satisfactorily explained by any verifiable correspondences but is instead a state mediated by, and thus

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[272] John Worrall, 'Philosophy and the Natural Sciences', in Grayling ed., *Philosophy 2*, (Oxford University Press, 1998) pg. 231

[273] quoted in John Worrall, 'Philosophy and the Natural Sciences', in Grayling ed., *Philosophy 2*, (Oxford University Press, 1998) pg. 231

[274] Thus a case for pragmatic scientific realism with regards the claims of Dynamical Systems Theory (and its application within Art History) is presented in the terms and vocabularies of the systems-thinking approach. This is a performative type of scientific realism based on conditions of plausibility such as that identified by McMullin: "The realist would not use the term 'true' to describe a good theory. He would suppose that the structures of the theory would give some insight into the structures of the world. But he could not, in general, say how good the insight is. He has no independent access to the world, as the antirealist constantly reminds him. His assurance that there is a fit, however rough, between the structures of theory and the structures of the world comes not from a comparison between them but from the sort of argument I sketched above, which concludes that only this sort of reasoning would explain certain contingent features of the history of recent science. The term 'approximate truth', which has sometimes been used in this debate is risky because it immediately invites questions such as *how* approximate?, and how is the degree of approximation to be measured? If I am right in my presentation of realism, these questions are unanswerable because they are inappropriate." See McMullin, 'The Case for Scientific Realism', in Leplin ed., *Scientific Realism*, (University of California Press, 1984) pg. 9-40.

relative to, both the psychic and social systems within which that 'truth' is represented. To claim the 'truth' of a statement is then not to make a claim about an homology between a system-state and any extra-systemic state, but is rather a statement about the internal conditions of the system which supports that 'truth' *at the time of the 'truth'*.[275]

In summary; representations of belief within either discursive or psychic systems are distributed across these systems and do not follow a binary principle of correspondence. Therefore, the issue of plausibility can be accounted for by isomorphic processes of representation within the following three systems. They are:

1 - The Psychic System - within which the 'truth' of a belief, and its relative plausibility is distributed and therefore cannot be given an exact value; instead it is represented as 'fuzzy' i.e. as more or less true (or more or less false.)

2 - The Discursive System - within which the 'truth' of a belief, and its relative plausibility is distributed over the system and cannot be therefore given an exact value but is represented in a 'fuzzy' sense as more or less true (or more or less false.)

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[275]By demanding nothing more from our epistemological technologies except efficiency in producing maximum output this flourishing of instrumentalism could be identified as the bringing of the industry of truth production within the sphere of influence of the system of the logic of (late) capitalism. Thus we can apply to truth production the rule of maximum productivity with maximum efficiency which is as Marx observed in The Grundrisse; 'the self preservation of capital is its self realization... Surplus value in general is value in excess of the equivalent. The equivalent, by definition, is only the identity of value with itself. Hence surplus value can never sprout out of the equivalent; nor can it do so originally out of circulation; it has to arise from the production process of capital itself... The great historic quality of capital is create this surplus labour, superfluous labour from the standpoint of mere use value, mere subsistence; and its historic destiny is fulfilled as soon as, on one side, there has been such a development of needs that surplus.' Marx, 'The Grundrisse', *The Marx-Engels Reader*[2nd ed.], ed. Tucker, (W.W. Norton & Company, 1978) pp. 248-9

3 - The Social System - within which the 'truth' of a belief, and its relative plausibility is distributed over the system and cannot be therefore given an exact value but is represented in a 'fuzzy' sense as being more or less true (or more or less false.) This is discussed below.

2.2.3 Truth and Normativity

The application of a 'distributed' understanding of 'truth' across different systems means that the concept of 'fuzzy' truth is not limited to the personal belief of an individual psychic system. To the contrary, as will become clear in the following, we can observe an *isomorphic* structure across a variety of systems. The micro-system of the human subject is reflected in the macro-system of discourse and society and vice-versa.

The same distributed model at work in the psychic systems is thus replicated in discursive and social systems. At the level of the social system this effects a normative function with regards to the representation of truth, as Wittgenstein suggested when he identified the public nature of language. Language is identified as a system of communication in which publicly accepted rules to the various 'language games'[276] prescribe the norms of communication. Plausibility the requires a normative dimension. As Wittgenstein put it:

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[276] 'I shall also call the whole, consisting of language and the actions into which it is woven, the "language game"', section 1, 7; and for Wittenstein this requires public involvement, 'And hence also "obeying a rule" is a practice. And to *think* one is obeying a rule is not to obey a rule. Hence it is not possible to obey a rule "privately": otherwise thinking one was obeying a rule would be the same thing as obeying it' section 1, 202. Both quotations from Wittgenstein, *Philosophical Investigations*, (Blackwell, 1963)

> *So you are saying that human agreement decides what is true and what is false?*
> - It is what humans *say* that is true and false; and they agree in the *language* they use. That is not agreement in opinions but in form of life.[277]

For example a theory that proposes the clearly ridiculous claim that the moon is made of cheese will immediately be rejected as false by most people despite the fact that by the year 2003 only twelve people have set foot on the moon. This is because the plausibly of that claim is not evaluated directly by every single individual but is instead distributed over the social system as a whole.

Representations of 'truth' are therefore not only dependent upon the credulity of individuals but are also distributed throughout the connections of the social system. They are not located in any particular area of that social system but are instead relative to the state of that social system. This has several implications;

(i) The distributed explanation of truth takes into account the normative function of truth within social systems (as illustrated by the cheese-moon example.) Obviously the absence of personal verification of beliefs by direct experience does not damage their normative validity.[278]

(ii) Socially mediated truths have permanence, which can be explained in systems-thinking terms as a function of memory (irreversibility) within

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[277] Wittgenstein, *Philosophical Investigations*, section 1, 241, (Blackwell, 1963)
[278] Likewise this argument can also be extended into the arena of socially mediated ethics whereby the statement murder is wrong is validated by the social acceptance of the statement. Ethics is a complex and problematic topic about which there is not the resources to enter into a more full discussion; and for many, like aesthetics, there can be no talk of ethics without metaphysics. This creates significant problems for any ethical discussion in the environment of an incredulity toward metaphysics. However normative views of ethics with regards to being necessary for the survival of the social (and psychic) system have been explored by writers such as Dawkins, who argues in *The Selfish Gene*, (Oxford University Press, 1976), that both genes and memes (ideas) replicate and adapt purely to ensure the survival of the system of which they are components.

complex systems. Complex systems 'lock-in' around certain patterns of behaviour (known as attractors) within those systems. Therefore the belief that the moon is not made of cheese is a belief around which the social system is firmly *locked-in*. Given this systemic social *lock-in*, this belief will require a significant change in the state of the social system to reject the accepted truth of this matter. Likewise a claim that the moon is made of cheese does not correspond to an internal representative state within the social system at the moment and will not be verified by that system in its current state.

As will be discussed at greater length in the second part of this thesis the phenomenon of *lock-in* within complex systems not only explains inertia in the social system with regards the popular acceptance of new scientific theories (such as the Copernican view of universe which was not immediately accepted because social system had memory of an anthropocentric universe) but can also be used to explain in other aspects of cultural life such as the history of art

(iii) By identifying the relativity of representations of truth with regards to the state of the social system within which they are represented, these 'truths' can be historicized, namely in relation to a given historical state of the social system. In short truth has a history.[279]

(iv) Dynamical Systems Theory is verifiable and plausible. It replaces a simple correspondence theory of truth with a distributive theory of truth that can account for the conditions of the emergence and validity of its claims. As such a valid and plausible branch of scientific research it should

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[279] "Truth, and its original reign, has had a history within history from which we are barely emerging" Foucault, *Nietzsche, Genealogy, History*, in Rabinow, (ed.,) *The Foucault Reader*, (Pantheon Books, 1984) pg. 76-100

prove a suitable tool for Art History to adopt in its guise as

Kunstwisschenshaft – albeit in a adapted form.

Conclusion: Dynamical Systems Theory and the Survival of Art History

In conclusion I'd like to turn back, again, to the 'will to survive' of systems. For discursive systems survival is ensured by plausibility, demonstrability and predictive success, for without these they will lose their social authority. It is argued here that the systems of Art History might adopt a systems theoretical strategy as a means of facilitating their evolution. In doing so they might negotiate their potential loss of authority and hence ensure their survival in the face of the threats posed to them by both the post-modern critique of discourse and post-modern artistic practice.

As a heuristic and explanatory tool Dynamical Systems Theory gets results. And it works in many and varied ways. They range from general examples (the VHS/Betamax market (discussed at length in a following chapter) to connectionist models of consciousness) to the particular application put forward in this thesis - as a contemporary discursive technology to be applied within the borders of Art History. And in doing so, through my adoption of a systematic strategy as a means of historical observation and representation, it can be seen as a continuation of, rather than part of a significant schism with, what Preziozi calls the *erudite machines*[280] within which Art is circulated. These are *erudite machines* such as the Art History of the Critical Historians of Art where:

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280 Which are: "places whose organization confers meaning and sense to the arrangement of things, and within which each object becomes the locus of an

> Objects speak in the third person (the historical mode) of what they are in relationship to other objects. That relationship is presented, furthermore, *as an expression or reflection of the meaning of a whole historical or evolutionary system*, which itself stands as a figure or emblem of the totality of a society (or the life of an individual) in its genesis.[281]

It is thus argued that the arguments of this thesis represent a continuation of the project and ethos of the systematic strategies of Art History (Kunstwisschenshaft) rather than a radical break from their history and traditions. *Dynamical Systems Theory* functions by using one principle (system) to identify both similarities and differences between different observed phenomena. Thus the concept of 'System' functions in the same way in which the concept of 'style' did for Wölfflin; the concept of 'kunstwollen' did for Riegl and the concept of human rationality did for Panofsky and Gombrich; namely as an Archimedean point from which to anchor ones critical activities. In doing so 'system' provides the criteria by which to find similarities and differences in what is observed.

Thus the application of the principle of system allows for a type of trans-historicism; albeit a trans-historicism which is performative and crucially (unlike that of the Critical Historians of Art) ultimately recognises its relativity as part of its working method and observations.

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analytical metamorphosis or transformation - the passage of things from being opaque and resistant to reading, to a state of transparency or legibility."
[281] Preziosi, 'History as an Art', intro. to chapter 4, *The Art of Art History*, ed. Preziosi, (Oxford University Press, 1998), Pg. 165 ff., emphasis added.

SECTION TWO

APPLICATIONS TO ART AND ART HISTORY

CHAPTER 4

Systems of Art

The Complex and Distributed Representational systems of the Art World

There's a machine which is called History of Art, which is a structure. And artist [sic] fits in this only because he or she is needed for this structure. If, for example, the History of Art needs some parallel lines, there is an individual who makes parallel lines. And this individual fits into this machine, which works by itself; it doesn't care about people or anything else, it just goes by itself.

Alexander Melamid[282]

Introduction

In this chapter I outline two central observations of the Systems-Theoretical approach as it is applied within the second half of the thesis. These observations are related to two key characteristics of complex systems namely:

(i) Positive Feedback and 'Lock-in' in complex systems

(ii) Distributed Representation[283] in complex systems.

In doing so, in this chapter I tackle three issues. These are:

1 - A reformulation of the *Institutional Theory of Art* from a systems-theoretical perspective. In doing so I argue that Danto's concept of the *Artworld* be observed as comprising of (amongst others) the following complex systems of distributed representation (and from which works of art 'emerge.'): (i) the work of art as a complex system; (ii) the art gallery and market as a complex system; (iii) art discourse as a complex system.

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[282] JoAnn Wypijewski, *Painting by Numbers - Komar and Melamid's Scientific guide to Art'*, (Farrar, Straus and Giroux, 1997)

[283] Luhmann argued (throughout *Social Systems*) that the systems-theoretical approach necessitates a paradigm shift in which the traditional conception of Representation is replaced with the concept of *Observation* which is contingent upon the system within which that observation occurs. However following Smolensky and Cilliers (et al) I argue that the concept of distributed representation is sufficiently distinct from traditional (iconographic or classical) representation to emphasise what is at stake. Further, the concepts of distributed representation and observation are not mutually exclusive; in other words both can be employed simultaneously without contradiction. Distributed representations are those which are distributed over the entire complex system and emerge from them rather than being located in particular areas of the system. And Observation is the process by which that behaviour is observed.

2 - An outline of Positive Feedback and 'Lock-in' as a key characteristic of complex systems as it is applied to the reformulation of the *Institutional Theory of Art* from a systems-theoretical perspective.

3 - An outline of Distributed Representation in complex systems as it is applied to the reformulation of the *Institutional Theory of Art* from a systems-theoretical perspective.

1 – The Ontology of Art: the *Institutional Theory of Art* from a systems-theoretical perspective

It is a central argument of my thesis as a whole that a response to the issue of the questionable ontology of the work of art (in particular the post-modern work of art) be formulated in Systems-Theoretical terms. This means the uncontroversial step of defining Art not in material terms but rather in terms of a function of certain social systems. In other words rather than being an inherently differentiated set of objects and practices a systems-theoretical approach, when applied to the question of art, argues that Art gains its definition from the systems within which it circulates. Hence art is not defined by any material particularity but is rather taken to be relative to these systems of differentiation and distributed representation.

There is a cluster of philosophical discussions based around the definition and ontological status of the work of art which has been loosely defined as *Institutional Theories of Art*. These positions can be distinguished from the project of The Critical Historians of Art in so far as they are not attempts to provide histories of art based on style (and attempts to explain changes of style over time), iconography, or representation. The *Institutional*

Theories of Art are rather philosophical attempts to account for definitions of art rather than place art in a historical teleology. It is for this reason that we can seek a common ground between such approaches and a systems-theoretical approach.

Arthur Danto calls the systems around which art circulates the *Artworld* which he identifies (in *The Artworld*) as a 'style matrix' of various influences and institutions.[284] Danto's Artworld system is a network of interrelated systems including not only the museum/gallery system but also the art market, art schools, art history, and all the protocols and conventions which form part of broader systems of which Art is part.

The celebrated example of Danto's argument concerns his encounter with Warhol's Brillo Boxes which he discussed first in the essay *The Artworld* and later at length in *The Transfiguration of the Commonplace*.[285]

Whilst Danto's meditation of the institutional system of Artworld was conceived as a response to Pop Art it raises a question which is transferable to the discussion on art in relation to complex systems of distributed representation. This transferable theme is the role context plays in the observation and representations of art; that is the processes by which certain objects and events are differentiated, observed and represented as art. Central to the argument of the Institutional Theories of Art is the claim that works of art are mere things that have no physical or metaphysical differentiation from other objects or their environment other than by virtue of the way in which those objects are represented and the systems where that observation and representation occurs.

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284 Danto, 'The Artworld,' (1964) in Madoff (ed.), *Pop Art a Critical Anthology*, (University of California Press, 1997) pg. 269-78
285 Danto, *The Transfiguration of the Commonplace*, (Harvard University Press, 1983)

Warhol: *Brillo Box*, (1964)

I argue that Danto's position be reformulated from within a systems-theoretical perspective with regards to the role the system of support plays in the differentiation of works of art from their environment.[286] Danto argued that commonplace objects were 'transfigured' whilst within the gallery space and were thus, in a process analogous to alchemy, transformed from objects into Art. This ontological transformation was not absolute and the representation of the objects as art remained relative to the system of observation.

Danto's argument was an immediate response based on a personal encounter with the Brillo boxes which Warhol exhibited at The Stables Gallery, New York in 1964. Danto's anxiety arose when trying to work out how these objects could possibly be seen as Art when they are, at first glance no different from packages in the storerooms of a supermarket.[287] As Danto was to later recall of the moment when he encountered the boxes:

> It was a most exciting moment, not least of all because the entire structure of debate which had defined the New York art scene up to that point had ceased having application. *A whole new theory was called for* other than the theories of realism, abstraction and

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[286] In the case of Minimalism (for example) this environment is the 'white-cube' of the gallery space.

[287] Nearly forty years on Danto's shock seems anachronistic especially given that Warhol's boxes are noticeably different from their mass-produced model. Made of plywood they clearly betray the process of their crafting in the obvious material grain of the wood and the perceptible in-exactness of some of the painted design. It would be hard to imagine anyone mistaking these works of craftsmanship for the hygiene and exactness of a mass-produced original. Perhaps this can be therefore seen as evidence of Danto working from within and yet against quite a traditional view of art; and trying to over turn his own prejudices. Thus Danto's observation can be seen to betray its own historical moment in so far as Danto needs to adapt his own, historically determined, idea of what art should be. Nevertheless the accuracy of Warhol's copies of the Brillo Boxes need not alter the efficacy of Danto's argument which concerns the role of the gallery system in the differentiation and representation of works of art.

> modernism which had defined the argument for Hopper and his allies and his opponents.[288]

The *Institutional Theory of Art* finds a further expression in Dickie's commentaries on the ontology of art[289] as being defined as an 'institutional concept' (his terms) rather than a physical class of objects.

> In Dickie's view Art is thus about the way objects are classified rather their physical qualities. And their existence is relative to that system of classification rather than any physical, or metaphysical, qualities. The significance lies in the way artworks are represented or performed by their system of support. By arguing in such a way Dickie states that he has rejected definitions of art in terms of it being about and expression of either Imitation or Emotion. In systems-theoretical terms Dickie's process of institutional 'classification' is stated as the function of two systemic processes. These are:
>
> (i) Differentiation; by which art is differentiated from its environment and
>
> (ii) Observation; by which that differentiation is observed by the relevant systems.

Firstly Dickie argues that theories of art up to the end of the eighteenth century were variations of what he calls the 'imitation theory of art'. He referenced such an impulse to Plato who argued that Art is a deception in that it imitates the form of beauty in nature.[290] Such an imitation theory of art finds an Art Historical expression in Gombrich's

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[288] Danto 'Pop Art and Past Futures' in *After The End of Art*, (Princeton University Press, 1997), pg. 123-24

[289] Dickie, *Art and the Aesthetic: An Institutional Analysis*, (Cornell University Press, 1974). Dickie's arguments have most recently been summarised in: Dickie, *Art and Value: Themes in the Philosophy of Art*, (Blackwell 2001)

[290] In book 10 of *The Republic* Plato uses the example of a bed to describes three modes of reality; the ideal form, the approximation of this which is fashioned by the carpenter and finally the imitation of the imitation which the artist conceives.

concept of 'Making and Matching'[291] in relation to artistic and art-historical practice in which he argued that art is about mimesis of the world according to the limits imposed by certain artistic conventions. In the imitation theory, which Dickie rejects, it is accepted that there is some property of the art work (in this case its ability to mimic and/or recreate a visual experience) which differentiates it from other objects.

Secondly Dickie identifies what he calls the 'expression theory of art'. The 'expression theory of art' is seen by Dickie as arising with Romanticism in the nineteenth century. He argues that in this conception of art the empiricism and rationalism of the Enlightenment was called into question. Dickie calls Romanticism, to which the 'expression theory of art' is linked:

> An attempt to reach behind the sensuous screen of ordinary knowledge to something thought to be vital and important. A strong aura of religion and mysticism hovers around Romanticism."[292]

According to the expression theory of the definition of art, Art is about the expression through the signs and symbols of Art in which the artist communicates their feelings emotions or intentions. Such a conception of art states that there is some property of the art work (in this case its ability to mediate and communicate an emotional experience) which differentiates it from other objects.

Dickie thus establishes a binary of theories of art which he rejects. On the one hand there is the materialism of the imitation theory in which art is special class of imitative objects and on the other there is the

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[291] Gombrich's theory of 'Making and Matching' receives it fullest expression in: Gombrich, *Art and Illusion*, (Phaidon, 1960)
[292] Dickie, *Art and the Aesthetic: An Institutional Analysis*, (Cornell University Press, 1974) pg. 39

metaphysics of the expressionist theory in which art is a special class of psychic objects. In contrast to both approaches Dickie proposes an argument which can be related to Danto's arguments in both *The Artworld* and *The Transfiguration of the Common Place* with regards to the way in which the artwork is represented and received and defined.

Dickie acknowledges that there may be different strategies for approaching the question of defining the work of art which are relative to the manner in which the work is to be defined. For example the work may be identified by evaluative criteria and the use of judgment to ascertain whether something is good enough to be a work of art. Secondly the work of art may be defined by classificatory criteria. Such judgments are related to how the relevant systems of classification observe and differentiate certain Art objects from other objects based upon certain qualities of the objects.

In summary of the above; with reference to the ambiguous ontology of art, it is these senses of distinction and classification, which Dickie uses as the crux for his definition of art as an 'Institutional Concept,' which can be reformulated by the systems-theoretical approach. This is in so far as the *Institutional Theories of Art* posit the definition of art as an act which operates according to the normative function of the systems which are used to observe, differentiate and describe it.

Danto had also argued from a similar perspective when he had suggested that it is through the act of classification that objects are differentiated and thus *transfigured* into Art. Hence the definition of art can be seen to be relative to the systems by which it is observed; and, as I

outline in the following chapters, those systems may behave in certain complex ways.

1.1 Semiotics, Narrative and Complex, Distributed Representation

As with all other art historical and critical tendencies the Institutional Theory of Art itself is an historically specific argument. Danto's essay 'The Artworld' first appeared in 1964 and was followed by Dickie's essay 'Defining Art' in 1969[293]. There are two points to note about this historical placing. These are:

(i) As Danto subsequently noted, it was a response to contemporary art movements, such as Minimalism and Pop Art, which made aesthetic capital out of a questioning of the environments within which they were being exhibited.[294]

(ii) It can be paralleled with other tendencies within the humanities to turn towards linguistics and semiotics as a mode of enquiry and structural analysis.

Both of these points draw attention to the point that their heart the institutional theories are stoutly materialist; they argue that art works *are* mere things and their aesthetic and social significance is relative to the ways in which they are ordered, classified and curated. One way of reading this ordering or re-presentation is that the argument be conceived of in semiotic terms and the concept of transfiguration be substituted for signification. The 're-signification of the commonplace' doesn't have quite

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293 Dickie, 'Defining Art' in *American Philosophical Quarterly*, (July 1969,) pg. 253-56.
294 See Danto, *After the End of Art*, (Princeton University Press, 1995) especially chapter 1, 'Introduction: Modern, Postmodern and Contemporary' in which he provides a historical account of his own arguments in relation to various 'End of Art theories,' (most notably his own and Belting's.)

the rhetorical punch of Danto's original but it brings the arguments back within the orbit of systems of representation. In short the Artworld might be conceived of as a representative system (in terms of a linguistic model of signification) and objects within it are thus 'transfigured' into art by being made to signify art. An example of this would be within the gallery system whereby Urinals and (ersatz) Brillo Boxes (and suchlike) become signs for art. Thus the objects are seen to have particular signifying functions relative to the system of representation, or narrative, within which they are re-presented.

However I argue that such a semiotic interpretation of the Institutional Theory of Art is limited in so far as it operates according to the representative model of signification (mediated by the signifier/signified correlation regulated by the logic of the sign.) Further, I argue that such an approach (likened to a structural or semiotic analysis of the representation of objects as art) can be expanded upon by applying the systems-theoretical approach to such representations. The complex model of distributed representation identifies both the contingency of the act of representation (as being relative to the system of that representation) and further identifies representation as being distributed over the entire system. In the case of the systems of the Art-world this means that instead of conceiving of particular objects as being represented as art from within particular narratives that 'art' emerges from the functioning of the entire systems of art (and its relative sub-systems.)

This observation regarding the concept of *distributed* representation being used to develop the representative model of signification is a particularly important claim within regards to other arguments advanced in

this thesis (and it receives a further explanation in the third section of this chapter.) These arguments concern the challenge to the structuralist basis for traditional notions of representation which the systems-theoretical approach advances. In others words it is not the case that by likening Institutional Theories of Art to linguistics or semiotics I am seeking to find a structuralist base for an analysis of the systems of the artworld. I am not using semiotics as the primary model for my systems-theoretical approach; and I am not seeking to subsequently embark upon a rigidly semiotic decoding of the signs and symbols of the artworld. Rather, by identifying similarities between different interpretive strategies which are founded upon the foregrounding of the significance of the representative act it is demonstrated that language, museums and art-history *and other complex systems* are all complex systems of *distributed representation* which display isomorphic patterns of behaviour. Such complex systemic behaviour includes: that all systems become 'locked-in' around specific examples and that they are self-organising and auto-catalytic and so forth. In other words it is not claimed that because both the artworld and language are systems that we can apply a linguistic analysis to the artworld, but rather that we can apply a similar systems approach to both linguistic systems and the artworld system as well as other complex systems.

2 – 'Lock-In': Positive Feedback and Irreversibility

In the following section I outline the concept of 'lock-in' in complex systems in terms of positive feedback and irreversibility. 'Lock-in,' is a key

concept of complex systems and I use it in the chapters following this one to explain how the social systems discussed become dominated by particular cultural forms (including definitions of art and art historical methods.)

W. Brian Arthur has analysed this particular aspect of the behavioural patterns of complex systems in the following terms:

> Dynamical systems of the self-reinforcing or auto catalytic type - systems with local positive feedbacks – in physics, chemical kinetics, and theoretical biology tend to possess a multiplicity of asymptotic states or possible 'emergent structures.' The initial starting state combined with early random events or fluctuations acts to push the dynamics into the domain of one of these asymptotic states and thus to select the structure that the system eventually 'locks into.[295]

By means of what he refers to as a "simple example of positive feedback"

Arthur uses the economic history of the domestic videocassette [VCR] market, and the evolutionary competition, during the period between 1975 and the mid 80's, between the two leading formats – VHS and Betamax to show how systems become 'locked-in' to certain behavioural patterns.

To give some background in 'Fast Forward: Hollywood, the Japanese and the VCR Wars' James Lardner briefly outlines the case study of the VCR consumer war.[296] In 1975 the Betamax format, which had been devised and was still controlled by Sony, held the monopoly on the sale of domestic VCRs. In America alone Sony sold 30,000 units during the year. However, the following year, JVC introduced the VHS format. By January of the year of the centre's completion (1977) JVC's hand was strengthened

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295 W. Brian Arthur, 'Self-Reinforcing Mechanisms in Economics,' in *The Economy as an Evolving Complex System (The Proceedings of the Evolutionary Paths of the Global Economy Workshop, held September, 1987 in Santa Fe, New Mexico)* - vol. V, Santa Fe Institute Studies in the Sciences of Complexity, ed. Anderson, Arrow, Pines, (Addison-Wesley, 1988)

296 Lardner, *Fast Forward*, (New American Library, 1997)

by the announcement that a further four Japanese electronics manufacturers (including RCA) had decided to construct and market VHS format VCRs. By 1978 Sony, who were still only marketing Betamax, held just 19.1% of the VCR market, compared to RCA's share of almost twice that at 36%. By 1979 VHS had become 'locked-in' as the system which lead the market and in 1981 only 25% of operating systems used the Betamax format. 'The battle [was] over' by 1987, according to an article which appeared in Rolling Stone[297] the same year. The following year, with VHS players now holding 95% of the VCR market, Sony finally conceded to manufacturing VHS formatted VCRs.[298]

Using the economic system within which the sub-system of the VCR market operates Arthur adopted the VHS/Betamax example to demonstrate an isomorphic principle which applies to the paradigms of *Dynamical System Theory* in general– namely that through positive feedback systems may perform in a 'self-reinforcing', 'autocatalytic' and 'locked-in' manner. By 'Locked-in' what is meant is that in a situation where any number of states which it is possible for a system to achieve, regardless of the merits of the alternatives, the system becomes phased-locked into one developmental path; and that this occurs through a combination of random factors, the effects of which are accentuated by positive feedback. His conclusion runs contrary to conventional economic theory which suggests that economic systems are subject to the principle of diminishing returns. Arthur argues that some markets do in fact behave like complex systems and are subject to increasing returns. This suggestion that some

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297 'Format Wars', *Rolling Stone*, (Jan. 15th, 1987, pg. 43)
298 'Sony Isn't Mourning the "Death" of Betamax', *Business Week*, (Jan 25th, 1988, pg. 37) and 'Goodbye Beta', *Time*,(Jan 25th 1988, pg. 52)

observations on the complex dynamics of complex systems are creatively and meaningfully transferable (to economic systems for example) in turn opens up a Pandora's box of descriptive possibilities which allow for the discursive suggestions that other cultural systems, such as the art market, art galleries and art histories, may also be seen to behave according to complex dynamics. In other words that they also become 'locked-in' around singular foci.

Arthur stated:

> Positive feedback economics, on the other hand, finds its parallels in modern non-linear physics. Ferromagnetic materials, spin glasses, solid-state lasers and other physical systems that consist of mutually re-enforcing elements show the same properties of the economic examples I have given. They 'Phase-lock' into one of many possible configurations; small perturbations at critical times influence which outcome is selected, and the chosen outcome may have a higher energy (that is, be less favourable) than other possible end states.[299]

In short, through a combination of factors the VHS format ended up gaining an upper hand in the VCR market and no-matter how slight this initial advantage was it became multiplied, through positive feedback, so that VHS ended up holding a virtual monopoly in the domestic market. This lock-in occurred because a number of factors were brought into play. For example, once a customer was enticed into buying one product it was unlikely that they would buy a similar product for economic as well as pragmatic reasons, as Arthur related:

> Each format could realize increasing returns as its market share increased: large numbers of VHS recorders would encourage video outlets to stock more pre-recorded tapes in VHS format, thereby enhancing the value of owning a VHS recorder and leading more people to buy one. In this way, a small gain in market share would

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[299] W. Brian Arthur, 'Positive Feedbacks in the Economy', *Scientific American*, (Feb. 1990)

> improve the competitive position of one system and help it to further increase its lead.[300]

There is also evidence to suggest that VHS was technically inferior and that the factors leading to its dominance may have been arbitrary – indeed Betamax is still the industry standard for video recording in filmmaking/broadcasting (although Lardner notes that JVC were the first

> to produce a [VHS] machine which doubled Sony's initial Betamax recording time of one hour, it may have been this advantage which swung the balance.)

Whatever the reasons the general principle remains; namely that in the developmental life of a complex, and non-linear system, a point of no-return, or bifurcation point, may be reached beyond which there is no turning back. The system thus becomes 'locked-in'.

2.1 Phase-Lock and System Attractors

The accumulative effects of positive feedback are also observable in another effect. This is that it may be that small causes can produce the large effects of phase-lock – this is the so-called butterfly effect whereby it is suggested that the flapping of a butterfly's wings in Paris could effect the weather in New York, or that small causes lead to the monopoly of VHS in the VCR market. When a complex (or otherwise) system has become 'locked-in' as the VCR market had by the mid-eighties then it can be said to be settled in around an *attractor*, and the apparent order can be regarded as an emergent property of the system. Such emergent (or macro) properties are common to the behavioural patterns of complex systems as Lewin describes:

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300 W. Brian Arthur, ibid.

> Most complex systems exhibit what mathematicians call attractors, states to which the system eventually settles, depending on the properties of the system. Imagine floating in a rough and dangerous sea, one swirling around rocks and inlets. Whirlpools become established, depending on the topography of the seabed and the flow of the water. Eventually you will be drawn into one of these vortexes. There you will stay until some major perturbation, or change in the flow of water, pushes you out, only to be sucked into another. This, crudely, is how one might view a dynamical system with multiple attractors: such as cultural evolution, with attractors equivalent to bands, tribes, chiefdoms and states. This mythical sea would have to be arranged so that the hapless floater would be first susceptible to whirlpool one first, from which the next available would be whirlpool two, and so on. There would be no necessary progression from one to two to three to four. History is full of examples of social groups achieving a higher level of organization and then falling back.[301]

There is a way that such emergent order of the so-called *attractors* within complex systems can be visualised and this is through the use of Phase Space. Phase Space maps are the visual maps that can be used in the study of physical systems, such as chaotic systems, and their behaviour. On a two dimensional graphical map the X and Y co-ordinates of a graph are used to represent the horizontal and vertical position of a point in space. But in phase space one variable of the map represents a position, but the other variable of the map represents a different variable such as the speed associated with the position. Gleick has given the following concise explanation of Phase Space:

> Any state of the system at a moment frozen in time was represented as a point in phase space; all the information about its position or velocity was contained in the coordinates of that point. As the system changed in some way, the point would move to a new position in phase space. As the system changed continuously, the point would trace a trajectory. For a simple system like a pendulum, the phase space might be just a rectangle: the pendulum's angle at a given instant would determine the east-west

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[301] Lewin, *Complexity*, (Phoenix, 1993)

> position of a point and the pendulum's speed would determine the north-south position. For a pendulum swinging regularly back and forth, the trajectory through phase space would be a loop, around and around as the system lived through the same sequence of positions over and over again.[302]

The descriptive utility of such a visual representation lies in that what is plotted is not what one would literally see since only one variable is a physical position. Instead, one is presented with a plot within the imagined phase space which depicts a general view of the behavioural patterns of the system, a view that whilst abstract, is both a suggestive and highly effective tool for studying the nature of complex systems as can be seen in the figure on the facing page which is taken from Gleick's book on Chaos.

As seen, the attractors are the parameters around which the system oscillates, which when visualised in a representation of Phase Space appear as the area and orbit around which the system becomes attracted. One of the reasons that this made such a large impact upon the scientific community is that, as can be seen in the fourth of Gleick's images, when plotted in phase space what at first appeared to be chaotic systems – from dripping taps to global economies – may in fact demonstrate some kind of order when visualised using phase space. This order appears to be manifested in the characteristic butterfly shape of the fourth image, the so-called Lorenz Attractor (named after Edward Lorenz, a pioneering theorist of Chaos Theory.)[303] This has caused many to ask the question - is there an emergent order in chaos? And if so at what stage does this order appear? From such questioning emerges the suggestion that order occurs within 'chaos' due to self organisation within complex, adaptive systems. Order

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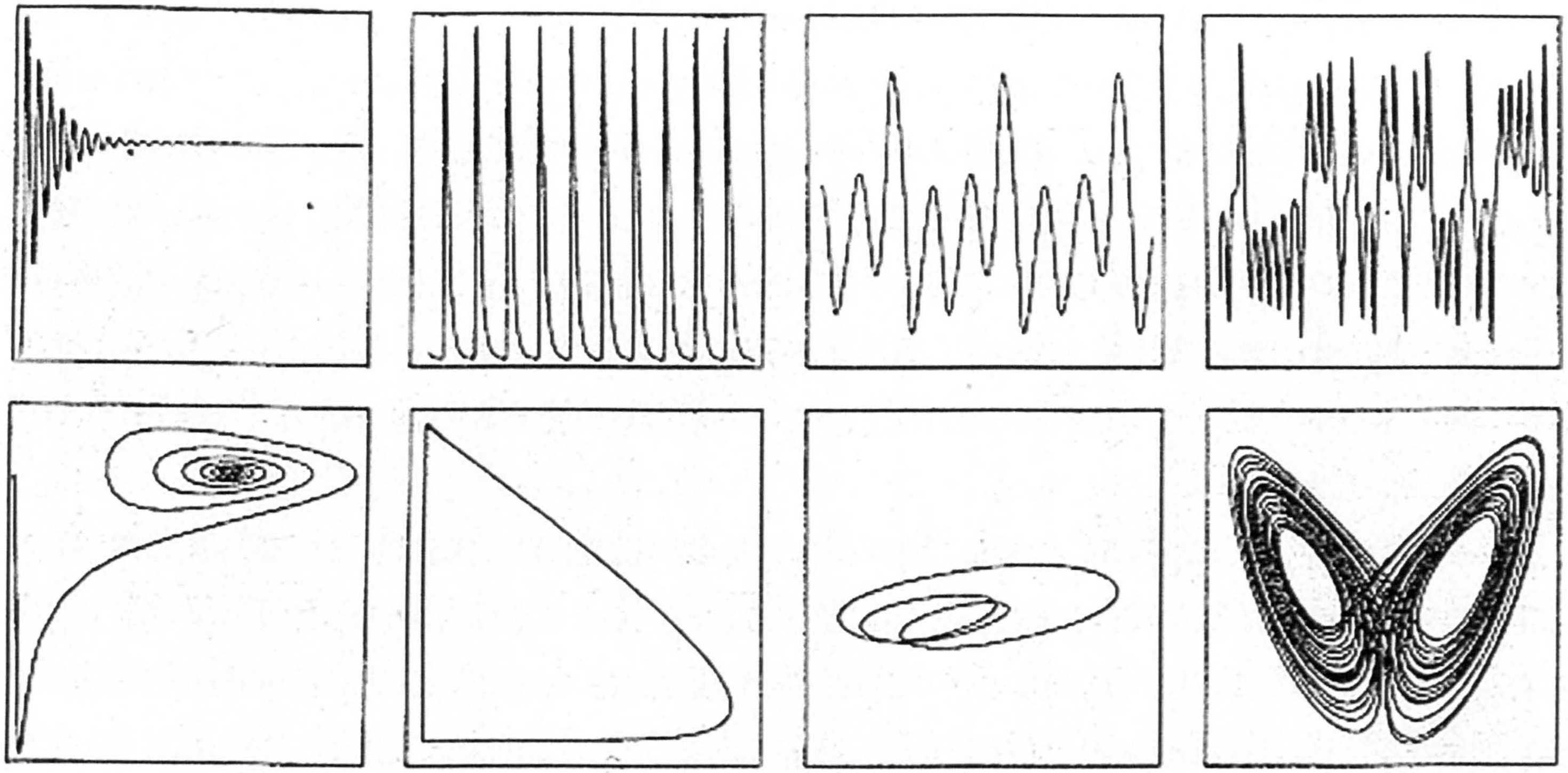
302 Gleick, *Chaos*, (Vintage, 1987)
303 Lorenz, *The Essence of Chaos*, (UCL Press, 1995)



MAKING PORTRAITS IN PHASE SPACE. Traditional time series (*above*) and trajectories in phase space (*below*) are two ways of displaying the same data and gaining a picture of a system's long-term behavior. The first system (*left*) converges on a steady state—a point in phase space. The second repeats itself periodically, forming a cyclical orbit. The third repeats itself in a more complex waltz rhythm, a cycle with "period three." The fourth is chaotic.

Image from **Gleick**: *Chaos*, (1987)

thus arises as an emergent property or a macro property of complex systems. In the chapters following this one I argue that isomorphic processes of irreversibility as can be seen in the complex systems of the artworld.

As seen in the video markets and the competition between VHS and Betamx, the system reaches a point of no return beyond which it is very hard, if not impossible, for the system to return to its previous state. This point of no return, or the *bifurcation point* is used to illustrate the irreversibility of complex system. In the video market this was the point of no return was the point at which VHS became the dominant format; and, via positive feedback, from this point gained an exponentially increasing market share over Betamax. The effect of positive feedback occurs because complex systems have memory. And because they have memory each state of the system is subsequently related to the previous system state. Hence when a system becomes 'locked-in' around an example it becomes very difficult to change the system's behaviour. I argue that when applied to the systems of the artworld that this can be used to explain patterns of cultural inertia and hegemony in systems-theoretical terms.

3 – Distributed Representation in complex systems

In this third section I outline a definition of distributed representation in complex systems. In short distributed representations are those which are distributed over the entire complex system and emerge from them rather than being located in particular areas of the system. More specifically I illustrate this by looking at how distributed representation functions in relation to two complex and distributed systems. These are:

1 - Cognitive Systems. By which thought is modelled

2 – Linguistic systems. By which language is modelled.

Traditionally both cognitive and linguistic systems are conceived of as involved in the representation of the world. Systems of thought represent the world with regards to epistemological representation; and systems of language with regards to linguistic representation. Also in both cognitive and linguistic models both language and epistemology are taken to be profoundly interconnected.[304] I argue that these processes of representation be conceived of in Systems-Theoretical terms as systems by which environments are *observed*; and likewise as systems which can be observed to be involved in processes of *distributed representation.*

Further, both models provide demonstrable examples of how the application of complexity and a systems approach provides us with models which can account for the Dynamic ordering and chaotic complexity of both the biological system of the human brain and the social system of linguistic expression. These examples also provide examples of where the Systems-Theoretical perspective, or a strategy which acknowledges complexity and emergence, brings a new conceptual paradigm to proceedings: that of *distributed representation.* It is to a description of this in relation to cognitive models to which I now turn.

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[304] One of the most complete defences of this position can be found in - Fodor, *The Language of Thought*, (Thomas Y. Crowell, 1975) - whereby the argument is advanced that thought is based on the symbolic logic of syntactic structures and semantic ordering. See also Chomsky's developed arguments concerning the inter-relationship between thought and language; most notably in, *Syntactic Structures*, (Mouton, 1957)

3.1 Two Models of Intelligence and complex systems: Distributed vs. Iconographic

The application of observing complexity to the problem of models of intelligence (which grew in research profile during the 1980's) provoked an ongoing and increasingly fierce debate within the Artificial Intelligence (A.I.) research community between two differing models of cognition. One is based on formal, symbolic logic as the basis for mental representation; I will argue that this approach can be seen as Iconographic in its outlook. The other side of the debate features a defence of cognitive models based upon complex, connected or what is called *Distributed Representation.* In short *Distributed Representation* (also called connectionism) provides a way of thinking about how the mind might work in a different way to a computer. In other words rather than representing via a system of formal symbolic logic - in an iconographic fashion, like a computer - it can be observed as a complex, dynamic and connected system which represents in a radically different manner.[305]

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[305] Cilliers has provided an excellent summary of the debate on representation and distributed representation in 'Problems with Representation,' (in *Complexity and Postmodernism,* (Routledge, 1998) Ch. 5) in which he argued that the very concept of representation itself is challenged by distributed representation. However it is also notable that he also retains the word representation in the concept of *distributed representation* demonstrating that whilst the concept of representation has been radically re-configured it has not been dismissed outright. See also S. Stich, D. Rumelhart, and W. Ramsey, Eds., *Philosophy and Connectionist Theory,* (Lawrence Erlbaum Associates, 1991) and especially: van Gelder, 'What is the "D" in "PDP"? An overview of the concept of distribution' & Haugeland, J. 'Representational genera.' Other discussions of distributed representation in cognitive systems include: French, 'Semi-distributed representations and catastrophic forgetting in connectionist networks,' in *Connection Science* 4, (1992) pg. 365-377; Haugeland, J. 'The nature and plausibility of cognitivism,' in *Behavioral and Brain Sciences,* 1, (1978) pg. 215-226; In W. Ramsey, S. P. Stich, and D. E. Rumelhart, (Eds.), *Philosophy and Connectionist Theory.* (Lawrence Erlbaum Associates, 1978) pp. 61-89; Hinton, G. E., J. L. McClelland, and D. E. Rumelhart, 'Distributed representations' In D. E. Rumelhart and J. L. McClelland, (Eds.) *Parallel Distributed Processing: Explorations in the Microstructure of Cognition.* (MIT Press, 1986) pp. 77-109; Kanerva, *Sparse Distributed Memory* (MIT Press, 1988);

There are three ways to conceive of the debate regarding the impact of distribution/connectionism on cognitive modelling. These are:

(i) That it can be used to replicate symbolic processing in a biologically plausible way; in this sense the 'language of thought' idea is retained but is implemented upon a distributed/connectionist system.

(ii) The distributed/connectionist system augments the symbolic language of thought model and fills in the gaps by providing, for example, a description of how systems might learn in a self-determining fashion but without the need to jettison the symbolic /iconographic 'language of thought' notion altogether.

(iii) The Connectionist models replace the symbolic/logical 'language of thought' models of cognitive architecture and the concept of representation itself. This radical approach is what Cilliers (1998) argued in his attempts to provide a synthesis between connectionism and post-structuralism at the linguistic *and* epistemological levels.

For me the question as to whether we can, at the moment, reach a final conclusion with regards to the implications of distributed/connectionist models on cognitive modelling is still unresolved. Nevertheless, what is clear is that the very existence of such models is

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Rumelhart, D. E., and J. L. McClelland. 'On learning the past tenses of English verbs' In J. L. McClelland, D. E. Rumelhart, and The PDP Research Group, (Eds.), *Parallel Distributed Processing: Explorations in the Microstructure of Cognition.* vol. 2: *Psychological and Biological Models.* (MIT Press, 1986) pg. 216-268; Smolensky, Connectionism, constituency, and the language of thought. In B. Lower and G. Rey, (Eds.), *Jerry Fodor and his Critics,* (Blackwell, 1991); Thorpe, 'Localized versus distributed representations' In M. A. Arbib, (Ed.), *Handbook of Brain Theory and Neural Networks.* (MIT Press, 1995) pg. 549-552; van Gelder, 'Compositionality: A connectionist variation on a classical theme' *Cognitive Science* 14, (1990), pg. 355-384; van Gelder, T. J. (1992). 'Defining "distributed representation."' In *Connection Science*, 4, (1992), pg. 175-191.

forcing the issue with regards to modelling the processes of the mind in a biologically plausible manner. Such plausible models suggested by connectionism and distributed representation will, it is argued, provide accounts which accommodate the clear structural dissimilarities between the von-Neumann computing machine of G.O.F.A.I. (the symbolic processing models of so-called Good Old Fashioned Artificial Intelligence) in which the mind is taken to be like a computer running the software of thought, and a biological system of interconnected and distributed elements from which intelligence may be seen to emerge out of increased systemic complexity.

Regardless of the models used to achieve the ends the central aim of artificial intelligence is to provide a model of human cognition (this being the model with which we are most familiar). The aim of this is to provide both an explanation of human consciousness and the theoretical possibility of generating an 'Artificial' (that is non-human) consciousness of some description.

A fundamental question of Modern, western philosophy is, as Descartes famously conceived of at the beginning of the Modern Age, the attempt to explain how to bridge the epistemological gulf between the internal mental life of apperception and the material world of mind independent reality.[306] Such Cartesian dualism was ultimately epistemologically unsatisfactory and it is an uncontroversial philosophical claim to assert that the successful modelling of the mind must provide us with a physical account of mental life and that we should not rely upon

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306 Descartes' celebrated idealist intercession of the rationalist soul with the physical world was achieved through the Pineal Gland, which mediated between the two worlds of the mental and the physical.

positing a mind/body split with a physical body being seen as ontologically distinct from mental activity and the apperception of a metaphysical soul/sprit.

The central task of artificial intelligence is, broadly conceived, to find the physical basis of mental activity and to model it using an non-human (or artificial) technology. Thus, if we can ever make a machine 'think' then three questions are thrown up. These are

(i) What is the physical support of 'thought'?

(ii) What is the nature of this 'thought'? (is it, for example, what Roland Penrose has called 'a very human prerogative'[307] or can it be replicated in other systems?)

(iii) What form does this 'thought' take?

In addressing these three questions the act of cognition is conceived of as the act by which the world (whatever this may be) is observed by the psychic system (or the mind) of the subject.

If it feels that there has been at this point a divergence from the central theme of the chapter (art and systems) then in response it is stated that this definition of complex systems, articulated via cognitive models of distributed representation (which will ultimately be applied to a systems-theoretical re-statement of the Institutional Theory of Art,) finds another expression in models of how the mind works. By looking at the mind as a complex system it is proposed that an understanding of how cognitive observation and distributed representation takes place be formulated.

Models of cognition which present the mind is a complex system suggest

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307 Penrose, *The Emperor's New Mind*, (ref.) pg. 3. Penrose argues that thought is peculiarly human and as a result will never be replicated artificially.

that it is a *Distributed System of Representation* and that mental activity is distributed over the whole cognitive system rather than being located in one particular area of the brain.

3.1.1 Mapping the Mind

Put very simply; the human cognitive system is a network of neurons. That's what the *soft-machine* (to use a William Burroughs term) of the brain is. These neurons are single cells which operate in conjunction with one another by transfer of electrical current and it is by this current that the biological system of our body is able to communicate with itself and, hence, think. Each one of these neurons is connected with up to 10,000 other neurons within the system via axons which transmit information and dendrites which receive information. The meeting point between the transmitting axons and the dendrites are the synapses. And these synapses are mediated, chemically, by neurotransmitters. One neuron by itself is almost insignificant and cannot 'think' by itself. Any significant form of mental activity requires the firing of millions of these neurons at once to generate thought.

In other words there is a physical basis for 'the mind' and this is a complex, biological system or interconnected cells. Here are two examples which demonstrate the grounding of consciousness in the complex biological physical system of the brain.

(i) The way psycho-active drugs work is by interfering with the activity of these neurotransmitters and in doing so altering thought patterns and hence perception. This provides us with an example of the impact a physical process can have on mental life.

(ii) Here is a more particular example.[308]

In 1998 surgeons at the University of California Medical School, using a 16 year old epileptic girl, applied a tiny electric current near to a part of her left hand side of the brain. This part was known to be related to humour. It was where Franz Gall, the founder of Phrenology, had located what he called the *Organ of Mirthfulness.*[309] The current caused the girl to laugh. When they asked her what was so funny she just said: "you guys are just so funny - standing around." When the current was applied again the girl found the picture of a horse in the room hilarious, and again, a third time she was amused by something else. What this example demonstrates is that a genuine human emotion, humour, can be explained by a physical cause in the complex cognitive system of the brain.

But, despite identifying a physical basis for thought as being grounded in this complex network of interconnected neurons there are various models for describing the ways in which that physical system *thinks.* As mentioned earlier representation provides us with ways of conceiving of this activity.

3.1.2 'Classical' or Iconographic Representation

When the discourse of artificial intelligence first began to emerge (in the early 1940's) the brain was taken to operate (and thus represent its environment) in the same way as a computer. This approach to cognitive modelling has been called both Classical Representation and Good Old Fashioned Artificial Intelligence - or G.O.F.A.I.. This approach, which I

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308 From *Nature*, 1998, quoted in Carter, *Mapping The Mind*, (Weidenfeld & Nicolson, 1998) Pg. 11

309 Carter, *Mapping the Mind*, (Weidenfeld & Nicolson, 1998) pg. 11

will call the Iconographic Approach, can be critiqued from a Systems-Theoretical perspective. The term Iconographic Representation provides a means of distinguishing this approach with the Distributed model of cognition applied in Connectionist models (and also invokes a particular model of art historical reconstruction to which it will be ultimately applied.)

Early attempts to 'map' the mind relied upon an understanding of computers based upon the von Neumann machine. This machine created by Hungarian mathematician John von Neumann (in the 1940s)[310] was a prototype digital computer and most computers today can be identified as conforming to the same van Neumann architecture. This architecture consists of a central processing unit which does the raw data processing of the machine according to principles of symbolic logic; that is bits of information have a symbolically representative function. This logical processing unit is the C.P.U. (central processing unit) of the computer. Secondly this C.P.U. works in parallel to an area of memory where information can be stored rather than symbolically interpreted. This area of memory can be accessed rapidly and at random and it does not need to be accessed sequentially (like information on a tape would have to be[311].) This Random Access Memory (or R.A.M) thus uses information in a non-semantic sense and provides it for the C.P.U. to semantically order.

The von Neumann machine works by storing instructions, or the *software*, as binary values (1s or 0s, or the states of connections being either on or off). These binary values (the 1s or 0s) are the raw data of the system and they are the instructions which are run, sequentially via the central

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310 For a history of the modern computer see: Ceruzzi, *A History of Modern Computing : 1945-1995 (History of Computing)*, (MIT, 1998)

311 hence difference between the von Neumann architecture and a Turing Machine which runs on a sequential tape.

processing unit. This data gains its symbolic, logical form relative to both its syntactic and its semantic ordering; the syntactic ordering corresponding to the order in which they're placed and the semantic ordering relating to the symbolic correspondence to their referents.

To reiterate; computers which function according to the von Neumann architecture work through the operation of a sequence of symbols presented to the central processing unit and its subsequent operation according to its particular, logical, interpretation of the symbols.[312] In effect the von Neumann machine is an iconographic system.

This GOFAI[313] model of the sequential, logical symbolical processing machine, when applied to how the mind works leads to a conception of the mind as, in effect, a 'wet' or 'soft' von Neumann machine. A dualism is posited between hardware and software. This is the view that is opposed by the systems-theoretical model of distributed cognitive representation. On the one hand there is the physical hardware which provides the architectural support for the logical operations of the system. In the computer this would be the hardware of the computer system and in the human brain the hardware is the biological soft-machine of grey matter. On the other hand there is the software or the language of thought which is the set of logical rules to be run on that hardware. This language of thought operates at a distinct logical level from the hardware.

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312 Putnam argued for this application of cognitive modelling in, Putnam, *Representation and Reality*, (MIT, 1988) although subsequently modified his position away from a rigidly symbolic model of mental representation.

313 In their connectionist models of cognitive architecture Rummelhart and McClelland have claimed that they are attempting to "replace the 'computer metaphor' as a model of the mid with the 'brain metaphor.'" Rumelhart & McClelland, 'on learning the past tenses of English verbs.' In Rumelhart, McClelland and the PDP Research Group (Eds.), *Parallel Distributed Processing, Volume I*, (M.I.T Press, 1986), pg. 75.

In the classical view of cognitive representation thought emerges because a type of software is being run on the brain.

Thus each 'thought' that the system has is taken to correspond to a particular logical function operating upon a particular part of the system. Hence each 'thought' is generated via the turning on of a bit of the system. GOFAI relies upon there being a symbolic correspondence between thoughts and the objects of those thoughts. And in contrast to the virtual engrammes of Classical Representation, Smolensky [314] has observed that in the connectionist model of distributed mental representation each 'thought' generated by the system is not the result of the turning on of one bit of that system, or the implementation of a particular, discreet piece of data. Instead, in a distributed system of representation the whole system must be on and each thought is distributed over the whole of that system.

I have argued so far that cognitive models of Classical Representation are based upon both a particular conception of mental representation and computation which are, essentially, iconographic in structure. The key issue here is that there is a direct correlation posited between the specific data processed by the cognitive system and mental representation. This symbolic correlation between thoughts and particular configurations of information means that classical mental representation is identified as an Iconographic model of thought. Classical representation is iconographic in so far as the model is based upon the positing of a rational correlation between signifier (in this case the semantic/syntactic ordered information) and the signified (the mental representation or thought). This

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[314] Smolensky is one of the leading advocates of the model of distributed representation. See: Smolensky, 'Connectionist A.I., Symbolic A.I. and the Brain,' *AI Review*, 1, (1987), pg. 95-110 & Smolensky, 'On the proper treatment of Connectionism,' *Behavioural and Brain Sciences*, 11, (1988), pg. 1-74.

rational correlation is mediated by the symbol system, or the logic of the language of thought.

In this model (opposed from the systems-theoretical perspective) cognitive systems are modelled as computational systems whereby thoughts are physical 'states' of the system and are expressions of a particular semantic and syntactic ordering of information. These physical states are thus the symbolic representation of particular thoughts. This could be called computational in so far as Cummings has observed: "The system merits inferential characterization because it computes representations of conclusions from representations of the corresponding premises."[315] And, hence: "The basic assumption of orthodox representationalism is that under proper interpretation, formal symbol crunching is cognition."[316] In other words a thought is conceived of as a program, a set of instructions or an algorithm which is run on the hardware of the brain and is understood by virtue of the symbolic language of thought.

Another way to look at this would be to invoke the idea of Engrammes and suggest that Classical Cognitive representation relies upon *virtual engrammes*. Engrammes are an anachronistic way of thinking about the mind as a library. (They formed the basis for Warburg's library as memory project in both his library and the Mnemosyne.) Engrammes are the physical parts of the brain where particular memories would be stored.

Thus if in the library if we burn down floor 11 then we'd have no Art

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315 Cummins, 'The Role of Representation in Connectionist Explanations of Cognitive Capacities,' in: Ramsey, Stich, Rumelhart, (eds.), *Philosophy and Connectionist Theory*, (Lawrence Erlbaum Associates, Inc., 1991) pg. 95

316 Cummins, 'The Role of Representation in Connectionist Explanations of Cognitive Capacities,' in: Ramsey, Stich, Rumelhart, (eds.), *Philosophy and Connectionist Theory*, (Lawrence Erlbaum Associates, Inc., 1991) pg. 95

Historical memory (in that building in Glasgow at any rate.) Similarly in the analogy of the engramme, if we lose the physical bit of the brain where we store our memory of horses then we will have no memory of horses. The classical approach is not an unsophisticated as to suggest that there is a particular physical location of every memory in the brain; it does not, for example, argue that we could point to the horse-representing part of the brain. However *virtual* engrammes form the basis of the Classical, Iconographic (G.O.F.A.I.) approach to cognitive modelling. This is because specific semantic and syntactic orderings of information, or precise data-strings, correspond, iconographically, to particular thoughts.

The major problem with classical models of classical representation lies in their basis upon the Engramme form. And until the Distributed models of Cognition based upon complex systems emerged in the 1980's models of the mind viewed the mind as a Physical Symbol System which was governed by rules of symbol manipulation[317]. Such models are: brittle; non-dynamic; complicated; have no common-sense and they don't learn.

As a result of these shortcomings such systems are characterised by their inability to deal with language as it is spoken and understood by humans. Language is not necessarily ordered and rational but is itself a complex, dynamic and fluid system full of redundancy and ambiguity. Language is not an expert system[318] for describing the world in a discreet

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317 The phrase 'physical symbol system' is attributed by Rumelhart to Alan Newel. See Ramsey, Stich, Rumelhart, (eds.), 'Preface', *Philosophy and Connectionist Theory*, (Lawrence Erlbaum Associates, Inc., 1991) pg. xi.

318 Expert System is a specific term which Coveney & Highfield define thus: "[a] computer program that uses a direct encoding of human knowledge to help solve complex problems, such as diagnosing an illness or interpreting the law. Also called a knowledge-based system." In Coveney & Highfield, *Frontiers of Complexity*, (Ballantine, 1996) pg. 426

(i.e. non-redundant[319]) manner, and there is no direct and unchanging, iconographic, symbolic relationship between the system of language and the objects it describes. Words can mean different things at different times and in different contexts. Similarly there is not an unchanging, symbolic and logical relationship between a language of thought and the content of that thought.

Classical representation is not an effective model for describing the way in which complex systems store and represent information. It is a logical, linguistic and, I would tentatively suggest, a structuralist approach to cognitive modelling.

3.2 - Distributed Representation in Complex Systems

In this following (sub) section I demonstrate the concept of distributed representation in complex systems via the example of an ant colony.

However distributed representation is not specific to this example and

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[319] Redundancy has a specific meaning in terms of information-theory defined in the following terms: "The variety in a channel that exceeds the amount of information actually transmitted. Its most common forms: (1) repetitive transmission of the same message over one channel, (2) duplication of channels, of which each could handle the transmission by itself, (3) restrictions on the use of characters or on the combinations of characters from an alphabet to form proper words or expressions (see language), (4) communicating something already known to its addressee. In the process of communication redundancy is essential to combat noise, to assure reliability and to maintain a communication channel. English writing is estimated to be 50% redundant which accounts for the ability of native speakers to detect and correct typing errors. Parity checks, which are common in communication within computers, enhance reliability but only at the expense of using additional channel capacity. The amount of information actually transmitted is not increased by this device. Similarly, Indian governments of the Mogul period are known to have used at least 3 parallel reporting channels to survey their provinces with some degree of reliability, notwithstanding the additional efforts." From Klaus Krippendorff's *A Dictionary of Cybernetics*, [an 80 page unpublished report dated Feb. 2, 1986]. Published *on Principia Cybernetica Web*, (the website of the *Principia Cybernetica Project* - (PCP)) At: **http://pespmc1.vub.ac.be/Default.html,** (Consulted December, 2003)

other complex systems including cognitive models and I argue the complex representative systems of the artworld also display isomorphic behaviour.

The ant colony as a complex system of distributed representation is an example which Eric Bonbeau presented at the O'Reilly Emerging Technology conference in Santa Clara in May 2002. For several years Bonabeau has been studying insect systems for examples of what he calls *Swarm Intelligence* from the Sante Fe Institute in New Mexico (which is center of complexity research where W.Brian Arthur amongst others work.) He's arrived at some examples of how an collective system of individually *stupid* ants (or other insects such as termites) can perform complex teleological tasks (that is tasks with a collective purpose.)[320]

The example Bonabeau provided is how a (complex) system of ants may find food in a maze. Bonabeau argues that the colony as a whole will eventually find the shortest route to the food. Given a collection of hungry ants (they must, Bonabeau observes, be given a collective reason to find food) in a maze, they will all wander about in a generally random way. This is because each single ant is pretty stupid (that is they have no individual volition to find the shortest route to and from the food and then remember that route.) However, given their random, non-rational, distribution throughout the maze, then it is inevitable that some ants will find the food. Ants communicate with one another through

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320 See Bonabeau, Dorigo & Theraulaz, *Swarm Intelligence: From Natural to Artificial Systems (Santa Fe Institute Studies on the Sciences of Complexity)*, (Oxford University Press, 1999) and Kennedy & Eberhart, *Swarm Intelligence*, (Morgan Kauffman, 2001), which contains (in chapter 2) a particularly useful discussion on 'swarm' systems in terms of distributed representation and applies this (in chapter 4) to observing social systems.

pheromones.[321] Thus on finding the food source and wandering back through the maze they leave a trial of these pheromones for other ants to smell. Those ants to arrive at the start of the maze first are, obviously, the ones who took the shortest route and will have left the strongest scented pheromone trail as it has had less time to evaporate. The remaining ants will be naturally drawn to the strongest pheromone trail and thus the ants will be drawn back again and again to the shortest route to the food. The striking thing about this system is that it contains within it the potential to remain dynamic and can learn future routes should they present themselves. If any ants should randomly find a better route then the system can adapt to this; the way to the food isn't fixed.

The ants are a connectionist system. And despite their individual 'stupidity' they could be argued to have a collective, or *Swarm* Intelligence. In his book *Out of Control: the New Biology of Machines, Social Systems and the Economic World*, Kevin Kelly calls this the Hive Mind.

> Ants, too, have hive mind. A colony of ants on the move from one nest to another exhibits the Kafka-esque underside underside of emergent control... The marvel of 'hive mind' is that no one is in control, and yet an invisible hand governs, a hand that emerges from very dumb members. The marvel is that more is different. To generate a colony organism from a bug organism requires only that the bugs are multiplied so that there are many, many more of them, and that they all communicate with one another. At some stage the level of complexity reaches a point where new categories like 'colony' can emerge from simple categories of 'bug'. Colony is inherent in bugness implies this marvel. Thus there is nothing to be found in a beehive that is not submerged in a bee. And yet you can search a bee forever with a cyclotron and fluoroscope, and you will never find the hive.[322]

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321 Pheromones are 'Chemical substances secreted by an organism that elicit a behavioural response from other organisms usually of the same species, especially substances that act as sex attractants.' Uvarov & Isaacs, *The Penguin Dictionary of Science*, 7th Edition (1993), (Penguin Books, 1993)

322 Kelly, *Out of Control*, (Perseus Books, 1994), pg. 13

If a colony of ants is observed as a complex system then it can also be observed that the path which they trace to and from their goals are distributed representations within that system. By doing so the power of this observation becomes present. The path within the maze to and from the food is a representation of the optimum path to and from that food.

Connectionism argues that brains are isomorphic to the ant colony; that is they are both complex systems of distributed representation. A distributed system of representation represents by virtue of aspects related to its complexity; specifically these aspects are:

(i) interconnection

(ii) non-linearity

Thus, isomorphic to the ant colony, a distributed system of representation is a network of interconnected elements. This interconnection is referred to as a *parallel* interconnection in so far as the separate elements can function simultaneously and do not have to work sequentially (in contrast a linear set of functions which must be executed one after each other.) It is because of this simultaneous interconnectivity that the operation of the system cannot be understood as a discreet sequence of rule based activities; but rather that the way that any part of the system operates and any particular representation within the system must be conceived of in terms of the functioning of the whole of the system.

In *Frontiers of Complexity* Coveney and Highfield give the following description of complex models of A.I.:

> Artificial neural networks mimic the brain's complexity through their non-linearity and a high degree of interconnectivity among their nodes. Like the brain, they are inherently parallel devices that

> can do many things concurrently. Qualitatively, their processors behave like neurons and the connections between them act like synapses. Any 'programming' of such a net consists of rules to alter the all important strengths of connections between processors. And the 'programs' that solve various problems emerge within such networks spontaneously.[323]

A connectionist cognitive architecture is based upon a network of

interconnected nodes, or meeting points. The links between the nodes are referred to as being *Weighted.* In a distributed system of representation information is shared by the whole network rather than being specifically located. Thus the information of the system is remembered and distributed over the system by the different weights of the connections between the nodes (or neurones) within the system. The *Weight* of an interconnection corresponds to the amount of information that each connection carries. A weight can have a positive or a negative value depending upon whether the connection assists or inhibits the flow of information between the nodes.

Thus as Cummins has stated:

> The state of the network at a given time is revealed by the pattern of activation at that time, that is, by specifying the activation level of each node at that time, and by the connection weights.[324]

As a result of this distributed representation and memory; by virtue of

differing weights between neurones a certain 'thought' generated by the

system is observed as a pattern within the system. This pattern, or output, is a function of the weights of the connections within the network. We can

think of these weights as being like the pheromone tracks of the ants with

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[323] Coveney and Highfield, *Frontiers of Complexity*, (ref. req.), pg. 302
[324] Cummins, 'Representation in Connectionism,' in Ramsey, Stich, Rumelhart, (eds.), *Philosophy and Connectionist Theory*, (Lawrence Erlbaum Associates, Inc., 1991) pg. 95

strong weights representing the shortest path to the food by a strong smell of pheromones and weak weights corresponding to a low smell.

3.2.1 Network Learning

The above example of the 'weighting' in a distributed network provides another distinction between Connectionist/Distributed systems and Classical/Iconographic systems with regards to how they 'learn'. In contrast to a Connnectionist system a system of Iconographic representation 'learns' by being given information from an external source in the form of a different program (algorithm) to be run on the hardware. An iconographic system treats memory as increased data in so far as there is more information provided about a particular symbolic (iconographic) representation.

To compare this with a connectionist system consider the example of the ant colony with respect to how they 'learnt' to find their food. If, in contrast, the same problem of optimum paths to food was presented to a classical, or iconographic, system, then the representation of the optimum path would have to be presented to the system symbolically from an external source in order for the system to 'learn' that path. It would need to be told the optimum path and then iconographically represent this path according to its own symbolic logic.

In contrast the connectionist system of the ants 'learns' the path through self-determination. It 'finds' the solution; or the optimum path 'emerges' from the complexity of the system. Similarly a connectionist model of cognition (such as a neural network) treats memory in terms of the changing and irreversible structure of the whole representative system.

A connectionist cognitive architecture learns not through the processing of more information but rather through an interaction with its environment during which time the environment changes the system and hence its output/patterns of distributed representation; just as more and more of the ants found the best way to get to and from the food in the maze.

In summary of the above section. As well as providing a plausible model of cognitive activity with regards the complex biological system of the brain the connectionist model also provides a plausible account of how complex systems can learn and how such learning has significant effects upon future functioning of the system. The information which is observed to be represented by a distributed network (of ants, or cognition, or the art world) at any particular time is the pattern distributed over the connections of the whole system at that particular time. Also, because distributed representation is a corollary of a pattern at a given time then that representation is observed as contingent. This means that the observed pattern that represents the system's state and hence the output of the system is dependent upon the previous state of the system.[325] As a result of this the system can be said to have *learnt* according to its previous state. Hence it can be said that a complex, interconnected system of representation, by virtue of its temporal specificity and its irreversibility, can be said to have a memory.

A distributed network has memory and 'learns' by changing the weighting structure and by changing the strengths of the interactions between the nodes a different pattern will be produced given the same

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[325] Further, as Luhman would argue, this representation is also contingent upon the system from which it is observed.

input. By comparing and then changing the weighting pattern for any given input in relation to an expected or required output.

To reiterate; there is a clear distinction between classical and connectionist accounts of representation in relation to how these systems learn. This difference is that in

(i) Orthodox, classical, iconographic, systems: learning is just another set of rules being run *on the same system*. in other words the architecture itself remains unaltered but the information circulating with the system changes.

(ii) Distributed or Connectionist systems: learning, and hence producing different representational content in response to particular inputs, means that the patterns within the system are themselves altered. The ants follow a different path. The system changes by the weights of the nodes changing which means that *the system itself changes* to meet the demands of producing different representational output.[326]

3.2.2 Distributed Representation and Deconstruction

In conclusion of the discussion on representation on the facing page are some distinctions between: Iconographic Representation[327] and the

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[326] Rumelhart & McClelland, have shown how a virtual connectionist system can be taught to 'learn' the English past tense of verbs and convert the present into the past tense in both regular and irregular verbs. The striking claim that Rumelhart & McClelland made of their model was it was given no specific rules for learning and that in the learning process that it duplicated some of the mistakes which children actually make; in Rumelhart & McClelland, 'on learning the past tenses of English verbs.' In Rumelhart, McClelland and the PDP Research Group (Eds.), *Parallel Distributed Processing, Volume I,* (M.I.T Press, 1986), pg. 75. Rumelhart & McClelland's model is critiqued extensively by Pinker & Prince and Fodor & Pylyshyn. Both critiques appear in *Cognition*, 28, (1988)

[327] It has been an un-stated implication of the chapter as a whole that traditional art history which is founded upon a humanist conception of rationality (in which epistemology is equated with mental representation,) is further implicated in the paradigm shift to connectionist models of cognition. However in both the iconographic and connectionist models an art historical method is paralleled in the model of cognition upon which it is, ultimately, founded.

distributed representation of the Connectionist (the so-called *hive mind*) model.

In conclusion of this comparison of Iconographic and Distributed systems of representation a potential criticism of connectionism (from within the non-connectionism A.I. community) is noted. However this criticism also throws its epistemological significance into relief. As Fodor & Pylyshyn (et al.) have argued; as a cognitive model for all its attempts to talk of representation in terms of networks of distribution, connectionism doesn't account for the fact that there is a rational language of thought and that language itself, through which that thought is expressed and communicated (within social systems) is logical, symbolic and iconographic. However as Cilliers has also observed the very concept of iconographic representation is what is at stake. He wrote:

> A distributed representation is not a representation in the conventional sense of the word. It dispenses with all the components of a representational system. There are no symbols that 'stand for' something, there are no grammatical relationships between them, and the system itself has no need of a semantic level of interpretation at all. We need neither a central processor nor an outside observer.[328]

Likewise the major impact of the post-structural critique of language and rationality lies in the questioning of the direct and logical symbolic correspondence of the signifier and the signified in a representative process. Instead what is favoured is a fluid, dynamic free-play of signifiers mediated by their temporal *difference* (to use the Derridian term) from one another. Likewise *distributed representation* is not iconographic in its representative form in so far as there is no discreet correspondence

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328 Cilliers, *Complexity and Postmodernism*, (Routledge, 1998) pg. 27

Iconographic Representation	**Distributed representation**
G.O.F.A.I.; Classical Systems	Connectionist systems
Symbolic correspondence between representation and represented	No quantifiable symbolic correspondence representation and represented
Semiotic representation	Non-semiotic representation
Complicated	Complex
Expert Systems	Systems which learn
Data	Pattern
Logic/Rules	Self Determination
Process performed via *Inference Engine*	Process performed via memory
Brittle	Adaptable
No 'common sense' (i.e. no capacity for self-determination and learning)	Capacity for self-determination and learning
Structuralism	Post-Structuralism
Von Neumann computer	Brain; Ant Colony

between signifier and signified which is mediated by the structural logic of the form of the sign (as Sausurre argued.) Distributed Representation cannot, therefore, be considered representation in the traditional sense of the word.

This connection between complexity and postmodernism is observed by Cilliers in his discussion of common-ground shared between the two discursive systems. And it is in the light of his observations regarding the isomorphisms between the systems-theoretical approach and post-structuralism that my thesis now turns with regards to how Art History might meet the theoretical challenge presented to its Iconographic method by Art after Modernism.

CHAPTER 5:

"CHAOS DAMN IT" - THE WORK OF ART OBSERVED FROM THE PERSPECTIVE OF DYNAMICAL SYSTEMS THEORY

Pollock: *Autumn Rhythm no. 30 1950*, Detail, (1950)

NO CHAOS DAMN IT

Jackson Pollock[329]

Introduction

As Art Historians upon approaching the work of art the key question we traditionally ask is *What is Being Represented?* There are a number of art historical strategies for answering this question ranging from issues of style, iconography to other cultural and historical analyses. From the systems-theoretical perspective (which challenges the traditional concept of representation) this question is reformulated and the following question posed instead: *What can be Observed.*[330]

What follows, in this and the following chapter, is an attempt to answer the question of what is being observed through an application of

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[329] "In 1950, *Time* magazine printed parts of an essay by Bruno Alfieri, previously published in Italy, which used the word 'Chaos' to describe the paintings of Jackson Pollock. Unable to let the criticism pass, Pollock sent *Time* a telegram that began, 'NO CHAOS DAMN IT.'" From Coddington, 'No Chaos Damn It,' in Varnedoe & Karmel (eds.), *Jackson Pollock: New Approaches*, (MOMA, 1999), pg. 101 ff.. Coddington discussed the order of Pollock's paintings in relation to his method but does not reference chaos-theory, fractal analysis or systems-theory in doing so.

[330] The paradigm shift from representation to observation is one informed by Luhmann's invocation of the concept of observation (and more significantly self-observation) as a dominant guiding principle in his systems-theoretical approach. He outlined the significance of observation in the following terms: "The relations that refer events, actions, conditionings, expectations, and structures to problems and that bind functions, references to unity and possibilities for comparison to them is not provided for in the performance of action alone; it is a matter of *observation*, that is, a matter of events or processes that are not immediately under pressure from a situation. Reproduction of the system can and will carry on without its unity being observed. Not everything depends on observation. Therefore, free of the pressure of having to produce results, observation can afford a more complex view of the system. Accordingly, in the domain of the societal system what we have called functional analysis is a principle of scientific system observation and not *eo ipso* a principle of self-organization for societal relationship that reproduce themselves everyday." (Pg. 300) and: "Observation is merely the management of a distinction – for example, that between a system and environment. It is not a specialized operation for acquiring knowledge, not analysis." (Pg. 177-8.) Both from: Luhmann, *Social Systems*, (trans. Bednarz jr. & Baecker,) (Stanford University Press, 1995)

the concept of complex system to works of art. More specifically in this chapter I will apply a systems-theoretical approach to the abstract work of Jackson Pollock and conclude that there are a number of different orders of representation that can be observed in relation to such work.

I have chosen the work of Jackson Pollock for this application for two reasons. Firstly, as is discussed below, it has been subject to an unsatisfactory systems analysis in which fractal patterns were identified in the images; in other words visual evidence of complex patterns have been identified in the work yet in a manner which did not, I argue, do justice to the radical implications of the Systems-Theoretical approach.

Secondly an encounter with abstract, non-representational art such as Jackson Pollock's *Autumn Rhythm: Number 30, 1950* highlights the problems inherent in seeking to establish what can be observed in an image. This is because in the apparent absence of a clear distinction between iconographic figure and ground and the lack of a recognisable schema of signs and symbols - the ambivalence and artificiality of this question about representation, or what can be observed is thrown into relief.

Further, the ambivalence and artificiality of representation in abstract art is suggestive of how the figure of the abstract work of art is itself be observed against the ground of art-historical discourse. This is to say that in the discursive systems of art (as discussed in the final chapter) the identity of the art work itself is observed as fluid rather than static, ambiguous rather than definitive, and abstract rather than concrete. In other words when dealing with abstract art the art historian must confront a dual challenge in ascertaining what might be observed, which whilst not

specific to abstract art is certainly fore-grounded by it. This dual challenge consists of attempting to construct meaning in the face of both a clear meaning in the work of art and even a single and obvious strategy for determining that single and clear meaning.

In outlining my arguments the chapter is organised according to the following structure.

1 - Answers to the question: What can be observed as represented by Jackson Pollock's *Autumn Rhythm: Number 30, 1950*?

In answer to this, and in relation to the fractal analysis of the image, I propose the following answers can be observed.[331]

(i) Nature/Mimesis/Representation – in which it is suggested that the images, by virtue of the fractal forms within them, can be said to represent nature in some sense.

(ii) Fractals – in which it is suggested that the images can be observed in the Formalist terms of their fractal patterns alone

(iii) An index of Process – in which it is observed that Pollock's work is an index of the chaotic process of its creation.

However, I argue that none of these observations are a satisfactory application of the systems-theoretical approach. This is because they treat the work of art as a self-contained representative entity. In doing so they do not focus their attentions beyond the artwork to the systems which it is embedded within or acknowledge the radical implications of the concept of *distributed representation.*

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331 As these observations concern self-similar acts of representation being observed at different scales they allegorically mirror the fractal form which they invoke.

2 – *Spiral Jetty* as a complex system of *Distributed Representation*

In this section I return to the very beginning of my thesis by arguing that Robert Smithson's *Spiral Jetty* (1970) is an artwork which is both complex and systemic.

1 – Answers to the question:

What can be observed as represented by Jackson Pollock's 'Autumn Rhythm: Number 30, 1950'?

Because an art-work can tell us only that which we ask of it, the answer to the question what is being represented by Jackson Pollock's *Autumn Rhythm: Number 30, 1950*? will depend upon the mode by which that question is asked.

The numerous questions which have been asked of what the art of Jackson Pollock represents reflect the cluster of disparate analytical critiques the art historian have at their disposal. Marxist, Feminist, Queer, Psychoanalytic, Iconographic, Iconologic and Formalist strategies are just some of the available. All of these approaches have offered different claims about various aspects of the work in response to different questions they have asked of it.

Yet in 1999 in two relatively unassuming papers which appeared in *Physics World* and *Nature*, two physicists made a quietly astonishing art historical claim. Richard Taylor, Adam Micolich and David Jonas stated that through the application of 'scientific objectivity' they could determine what they claimed to be the 'fundamental content' of Jackson Pollock's

major work, namely the splatter paintings he produced between 1940 and 1952.

To determine this 'fundamental content' Taylor, Micolich and Jonas' method of objectivity involved an analysis of the particular mathematical patterns which they discovered in the paintings. It was demonstrated that patterns within the work satisfied the formal descriptions of fractals. Fractals are patterns which appear in complex systems when they are looked at in a certain way. Therefore by finding such patterns in Pollock's work it could be claimed that like other complex, and fractal systems, Pollock's work could also be called a complex visual system. Such an approach thus demonstrates one way of applying the concept of system to the artwork. Yet an approach that I subsequently demonstrate is unsatisfactory; both for it's formalist pre-occupations and its reliance upon a traditional conception of representation.

1.1 What is a fractal?

Stated simply a fractal is a self-similar pattern.[332] This means that the shape is the same at different scales of magnification. A visual example of such a complex, fractal pattern is provided by the von Koch Curve[333] (see image

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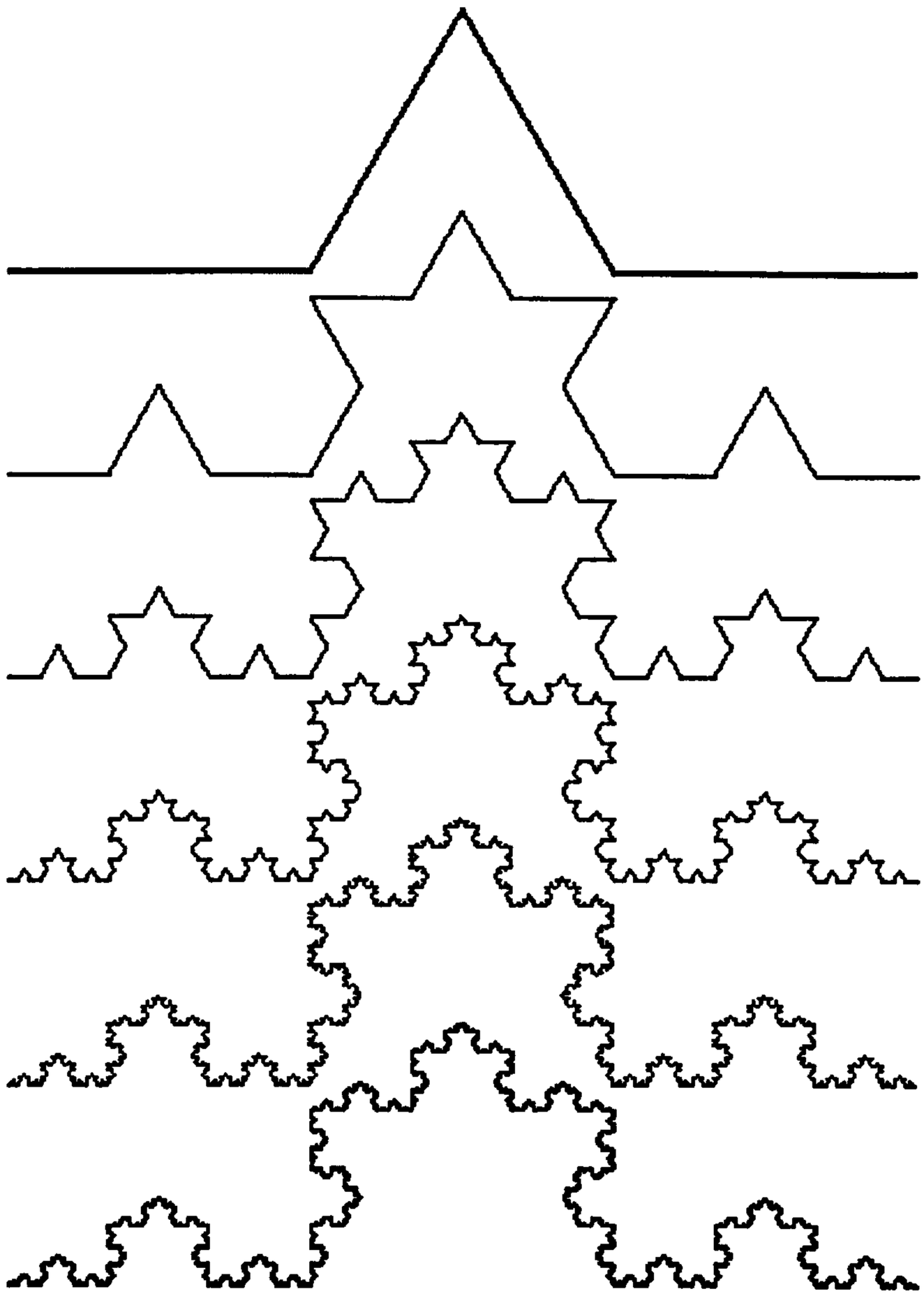
[332] The literature on fractals is vast. The best introduction to the often baffling theory and application of fractal geometry is found in Gleick *Chaos*, (Vintage, 1998). The classic work on fractals is Mandlebrot, *The Fractal Geometry of Nature*, (WH Freeman and Company, 1977) which is a balance between accessible descriptions of the implications of the theory and obscure mathematics. More recent discussions on the applied use of fractal geometry include: Fleischmann, Tildessley, Ball (eds.), *Fractals in the Natural Sciences*, (Princeton University Press, 1999); Peitgen, Saupe (eds.), *The Science of Fractal Images*, (Springer Verlag, 1988); Peitgen, Richter, *The Beauty of Fractals*, (Springer Verlag, 1896).

[333] The Koch curve is so named after the Helge von Koch who first described the pattern in 1904



The von Koch curve represented at different stages of its genesis

Richard Voss: "A simple line segment is divided into thirds and the middle segment is replaced by two equal segments forming part of an equilateral triangle. At the next stage in the construction each of these four segments is replaced by four new segments with length 1/3 of their parent according to the original pattern. This procedure, repeated over and over, yields the beautiful von Koch curve."

on facing page.) This is a pattern which is complex, as opposed to complicated, and hence it is a pattern associated with complex systems.

The Koch Curve can be constructed using the following simple rule given by Richard Voss:

> A simple line segment is divided into thirds and the middle segment is replaced by two equal segments forming part of an equilateral triangle. At the next stage in the construction each of these four segments is replaced by four new segments with length 1/3 of their parent according to the original pattern. This procedure, repeated over and over, yields the beautiful von Koch curve.[334]

Thus, by the continued iteration of the initial rule of construction, an image emerges which will be infinitely complex in so far as it will obey this simple rule regardless of the scale of magnification at which it is viewed. The edge of the Koch curve, comprised as it is of ever diminishing triangles, is a loop which tightens in upon itself to a greater degree the higher the magnification. Further just as the detail of the edge of the image will continue to increase as the scale of magnification of the image increases to infinity so too the length of the line around the space enclosed by the edge of the fractal is infinite. Therefore if we take the initial triangle from which the curve is extrapolated, as having sides of length 1 then, as Gleick explained:

> The length of the boundary is 3 x 4/3 x 4/3 x 4/3.... - infinity. Yet the area remains less than the area of a circle drawn around the original triangle.[335]

This highlights a key paradox of the fractal. This paradox concerns the incongruity between the area of the fractal, which can be shown to be less

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334 Voss, 'Fractals in Nature: From Characterization to Simulation', in Peitgen and Saupe (eds.), *The Science of Fractal Images*, (Springer - Verlag, 1988) pg. 26
335 Gleick, *Chaos*, (Vintage, 1987) pg. 99

than the area of a circle drawn around the whole image, and the possibility that this finite area is contained within an infinitely long edge. Looked at in a slightly different way, this can, again, be conceived of as an issue of scale with the length of the edge of the curve being seen as relative to the scale at which we observe the image.

Gleick's description of how to generate a von Koch curve by taking a simple command and then repeating it further demonstrates how the pattern is also a visual analogue for a complex, systemic process. It thus demonstrates another systems principle; that of irreversibility and the role of memory in the genesis of the pattern. The Koch curve is generated by repeating a simple instruction and therefore the pattern has 'memorised' the conditions of its creation. This illustrates a third key systems principle; namely that small causes can have big effects because of the role played by positive feedback in such systems. This is also known as the butterfly effect.

Before the discussion on Jackson Pollock's work in relation to such fractals which follows below I will first outline in more detail how fractals patterns, described briefly above and identified in Pollock's work, are more specifically related to complex systems. In short fractals provide visual evidence of complex behaviour within dynamical systems. In other words they are a means of visualising complexity. It is by virtue of this visualisation of complexity that they were applied to the complex, dynamic visual systems observable within Pollock's work.

Fractals are the most easily recognisable icon of the discourse on chaos and complexity. It is no surprise therefore to see an fractal displayed on the cover of Gleick's bestseller *Chaos*. Fractals, such as the von Koch

curve, are complex and self-similar patterns which emerge from simple rules. Fractals can be used to provide visual models of the states and behaviours of complex systems. Used in this way they provide an easily recognisable visual representation of certain patterns within mathematical models of complexity. As Gleick said; despite the fact that:

> The mind cannot visualize the whole infinite self-embedding of complexity... In the mind's eye, a fractal is a way of seeing infinity.[336]

Infinitude is invoked conceptually when looking at a fractal image because a fractal is a mathematical concept and the pattern they produce demonstrates an infinite level of self-similar complexity. This means that strictly speaking the reproduced images which have come to represent fractals of chaos in the popular consciousness, such as that on the cover of *Chaos* are not fractals in the sense of duplicating their complexity to an infinite degree of scale. Due to limitations of printing procedures, and suchlike, the reproduced images we see of fractals do not, by necessity, replicate to an infinite degree of magnification. However they are representations of various mathematical models and are, as such, visual analogues of conceptual ideas of infinite self-similarity.

Fractals contain within their replicating patterns a conceptual signpost to an infinite degree of self-similarity. It is by virtue of this infinite degree of self-similarity that they are patterns which are dynamic and complex. Like the very specific distinction between complicated systems and complex systems *Fractal* refers to a particular type of visual and systemic complexity which is conceptually distinct from the merely visually

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336 Gleick, *Chaos*, (Vintage, 1998) Pg. 98, 101

complex. Fractals are not merely complicated images or ones containing a high level of detail and a complicated image is not (necessarily) fractal by virtue of its level of detail. A printed-circuit board, for example, is very complicated and could well contain detail beyond the ability of the unaided human eye to perceive, it is not however a fractal. The systems connected with fractals are, instead, complex. As is discussed in a previous chapter these systems are complex (related to the dynamics of the complex system) as opposed to the complicated (related to systematic informational density). The fractal system is Complex in the Systems definition of the word as being distinct from complicated with regards to what Cilliers has observed: "I have heard it said, by someone from France, of course, that a Jumbo Jet is complicated, but that mayonnaise is complex."[337]

A fractal is then, in some respects, similar to Mayonnaise.

Fractals are defined as being complex because of a fundamental characteristic of their make-up - namely self-similarity. Further it is by virtue of their self-similarity that their complexity emerges. Self similarity means that the structure is similar to itself over different scales or different degrees of magnitude. The pioneer of Fractal Geometry Benoit Mandlebrot defined his discovery of fractal geometry in the following terms;

> Broadly speaking, mathematical and natural fractals are shapes whose roughness and fragmentation neither tend to vanish, nor fluctuate up and down, but remain essentially unchanged as one zooms in continually and examination is refined. Hence the structure of every piece holds the key to the whole structure.[338]

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337 Cilliers, *Complexity and Postmodernity*, (Routledge, 1998), pg. 3

338 B.B. Mandlebrot, 'Fractal Geometry: what is it, and what does it do?', *Fractals in the Natural Sciences; a discussion organized and edited by M. Fleischman, F.R.S., D.J. Tildesley and R.C.Ball*, eds. M. Fleischman, D.J. Tildesley and R.C.Bal, (Princeton University Press, 1989) pp. 3-16

The implications of Mandlebrot's observation are that every part of a fractal image can be described in the same terms as any other part of the image. Thus, no matter what level of magnification a fractal is viewed at, it can always be described by using the same rules. Mandelbrot further observed:

> The key to fractal geometry's effectiveness resides in a surprising discovery that the author has made, largely thanks to computer graphics. The algorithms that generate the other fractals are typically so extraordinarily short, as to look positively dumb. This means that they must be called 'simple'. Their fractal outputs, to the contrary, often appear to involve structures of great richness.[339]

The Koch Curve is one of simplest ways of conceiving the idea of a self-similar structure. It will be visually similar, and will look the same at any level of magnification, because every part of the structure will conform to the simple re-iterated rule of construction given above. However a structure can still be self-similar and hence fractal without maintaining exact visual similarity across scales. This is because self-similarity can extend to *statistical self-similarity* (Voss)[340], meaning that the same, simple mathematical rule describes the macro and micro elements of the particular complex structure. It is this balance between simplicity and complexity which distinguishes fractal models from the merely complicated. Based, as they are, upon simple 'rules' re-iterated infinitely their structure, like other complex systems is based upon a certain order which is at once basic yet multiplex, ordered yet dynamic, determined yet random.

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339 B.B. Mandlebrot, 'Fractal Geometry: what is it, and what does it do?', *Fractals in the Natural Sciences; a discussion organized and edited by M. Fleischman, F.R.S., D.J. Tildesley and R.C.Ball*, eds. M. Fleischman, D.J. Tildesley and R.C.Bal, (Princeton University Press, 1989) pg. 6

340 Voss, 'Fractals in Nature: From Characterization to Simulation', in Peitgen and Saupe (eds.), *The Science of Fractal Images*, (Springer - Verlag, 1988) pg. 30

There is a further relationship between Fractals and complex systems. This relationship occurs because it is also the case that fractals are most likely to become apparent in those complex and dynamical systems which are poised in a state of non-equilibrium; that is within systems which are described by Broomhead and Jones as systems whose: "dynamical behaviour is governed by non-linear evolution equations."[341] This includes such dynamically chaotic systems such as those which have been observed in the natural world which include systems such as those seen in connection with neuron activity (in conscious systems), chemical reactions, fluid flows and economic systems, all of which have been modelled using the methods of fractal geometry.[342] Further examples of this are provided by Gleick who related how problems in the mapping of human anatomy have been solved through the application of fractals. To illustrate the wide variety of systems which display fractal patterns here are some examples: The Urinary collecting system, for example has been shown to be constructed according to a fractal structure,[343] as have the edges of clouds and the economic system of 20th Century cotton prices as analysed by Mandelbrot.[344]

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341 Broomhead and Jones, 'Time-Series Analysis', *Fractals in the Natural Sciences; a discussion organized and edited by M. Fleischman, F.R.S., D.J. Tildesley and R.C.Ball*, eds. M. Fleischman, D.J. Tildesley and R.C.Bal, (Princeton University Press, 1989) pg. 103

342 See especially Fischer and Smith ed., *Chaos, Fractals and Dynamics*, (Marcel Dekker Inc., 1985) and Peitgen and Saupe (eds.), *The Science of Fractal Images*, (Springer - Verlag, 1988)

343 Gleick, pg. 109. Other examples can be found in Peitgen and Saupe (eds.), *The Science of Fractal Images*, (Springer - Verlag, 1988) and *Fractals in the Natural Sciences; a discussion organized and edited by M. Fleischman, F.R.S., D.J. Tildesley and R.C.Ball*, eds. M. Fleischman, D.J. Tildesley and R.C.Bal, (Princeton University Press, 1989)

344 'Indeed when Mandlebrot sifted [Houthkakker's] cotton-price data through IBM's computers, he found the astonishing results he was seeking. The numbers that produced aberrations from the point of view of normal distribution [and the classical economical model of supply and demand] produced symmetry from the point of view of scaling. Each particular price change was random and

Because, in a fractal pattern, the micro corresponds to the macro, by having the same description across different orders of magnitude, the structural organisation of the system is duplicated throughout the different scales of that system. This provides another example of the principle of self-organisation which I have observed elsewhere within this thesis as a key characteristic of complex systems. In other words the system is organised according to simple rules which have been iterated (that is repeated) at different scales. Further, this demonstrates how a fractal pattern demonstrates another characteristic of complex systems; namely irreversibility and the role systemic memory plays in the structure of the system via processes of positive (and negative) feedback. Because a fractal pattern is formed by the repetition of these simple instructions the role of systemic memory forms part of the way that pattern is formed. The system, in its entirety, has remembered the initial and subsequent iterations of that instruction, within the pattern which accumulates. Hence via positive feedback every iteration forms part of the structure of the whole system. An example of this is demonstrated in the now-familiar *Butterfly Effect.* A Butterfly flapping its wings in Glasgow and causing a tidal wave in New York could be likened to a fractal pattern whereby a self-similar pressure wave to that of the butterfly's wings is the, now amplified, tidal wave. To return again to the Koch Snowflake as a means by which to visualise such behavioural patterns; the complexity of this pattern is a function of the

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unpredictable. But the sequence of changes was independent of scale; curves for daily prices and monthly price changes matched perfectly. Incredibly, analyzed Mandelbrot's way [according to fractal patterns] the degree of variation remained constant over a tumultuous sixty-year period that saw two World-Wars and a depression.' Gleick, *Chaos*, (Vintage, 1998) pg. 86

system 'memorising' and subsequent repeating the initial motif of the pattern.

In summary of the above introduction to the form of the fractal it is argued that the analysis of fractals represents a systems approach in so far as it focuses attention upon the whole structure, or system, of the fractal across all scales.

In the arguments that follow below it is conjectured that if we can find evidence of fractals within a work of art then we have found a way of finding a system (in this case a complex visual system) within the work of art. This might, therefore, suggest a way of applying the systems-theoretical approach within Art History.

1.2 Pollock, Fractals and Systems

Artistic activity involves acts of representation and fractals are a visual analogue of a theoretical mathematical model. It is argued therefore that the act of representation provides a link between fractal mathematical models and art. It is further argued that because fractals provide specifically visual evidence of complex systems, if they can be identified in particular works of art then we have, perhaps, found evidence of complex, systemic behaviour within those works of art. Evidence of Fractals in certain artworks would then provide a demonstration of the formal concept of system to the work of art. This has, arguably, been demonstrated by the discovery of fractal patterns within the splatter paintings of Jackson Pollock, which, according to certain fractal analysis, can be seen to demonstrate evidence of complex, chaotic and hence systemic properties.

Three theoretical physicists, Richard Taylor, Adam Micholich and David Jonas, have attempted such a fractal analysis of Pollock's images. In conclusion they argued that certain of Pollock's abstract canvases are fractal. That is that they satisfy a calculation of fractal dimensions whereby, like other naturally occurring fractals such as coastlines and the edges of clouds etc.:

> The large amount of repeating structure within a fractal pattern causes it to occupy more space than a smooth on-dimensional line, but not to the extent of completely filling the two dimensional plane.[345]

Fractal dimensionality is the method Mandlebrot used to describe the relationship the viewer has to the object with regards to scaling, or the level of detail at which the object is analysed. Contrary to the 3 dimensions of Euclidean geometry, of height, depth and breadth, of which we are intuitively familiar, fractal dimensions need not be an integer. Fractal dimension is a way of expressing a level of detail of a self-similar shape in relation to the observer's level of scrutiny. Thus the fractal dimension, or D, provides an expression of the level of detail of that shape, or, as Voss has explained: "the fractal dimension D, thus, provides a quantitative measure of the wiggliness of the curves."[346]

Gleick describes this concept of fractal dimensions thus:

> What is the dimension of a ball of twine? Mandlebrot answered, it depends on your point of view. From a great distance the ball is no more than a point, with zero dimensions. From closer the ball is seen to fill spherical space, taking up three dimensions. From closer still, the twine comes into view, and the object becomes effectively one-dimensional, though the one dimension is certainly tangled around itself in a way that makes use of three dimensional space.

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345 Taylor, Micolich, Jonas, 'Fractal Expressionism,' *Physics World*, (vol. 12, 10, October 1999) pg. 25-28

346 *The Science of Fractal Image*s, pg. 29

> The notion of how many numbers it takes to specify a point remains useful. From far away it takes none - the point is all there is. From closer it takes three. From closer still, one is enough - any given position along the length of twine is unique, whether the twine is stretched out or tangled up in a ball.[347]

For certain shapes, Mandlebrot argued, their dimensionality is best expressed in terms between integers; they are, in other words, not clearly defined by one scale, but instead have a certain, yet characteristic irregularity which remains constant over different scales. This is the regular irregularity of the self-similar and infinite patterns suggested by fractals.

The concept of Fractal dimensions is an obscure one which requires detailed mathematical working to express fully. Let it therefore suffice to acknowledge that within the practice of fractal analysis, dimensions of between 1 and 2, for complex and irregular shapes indicate that the shape has a fractal dimension. Therefore if such a dimension could be discovered in a shape it could be identified as a fractal. Such methods were applied by Jonas et al. to Pollock's canvases and in conclusion it was suggested that by satisfying the formal descriptions of fractals it could be argued that the canvases of Pollock could be successfully analysed as if they were complex systems.

To demonstrate the existence of fractals within Pollock's painting the work *Number 14, 1948* (see image on facing page) was analysed using the following method. A 5 x 5 cm. square was placed over the canvas at various points and the patterns with analysed according to pattern density. The conclusion reached was that the pattern within the square was self-similar, in so far as it could be described using the same formal rules of

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[347] Gleick, *Chaos*, (Vintage, 1998), pg. 95

Pollock: *no 14, 1948*, (1948)

fractal description, at different places on the canvas. Further, this pattern was seen to be similar to that observed in other chaotic and naturally occurring systems such as the edges of clouds, river patterns, coastlines and lightning paths.[348] It was concluded, therefore, that certain of Pollock's 'all-over' drip paintings from between 1940 and 1950 were not just randomly chaotic, but that they could be expressed by fractal dimensions.

The second stage of the analysis thus moved to calculating the fractal dimension of certain paintings; this entailed discovering the certain mathematical descriptions of these observed patterns, in order that they could be compared both with each other and with other fractal patterns, such as naturally occurring ones. These were calculated in the following manner.

The chosen painting was scanned into a computer and overlaid with a computer-generated grid of identical squares. This was to allow for the so-called 'box-counting' method of analysis. Numerous counts were done, each using different sizes of squares between the very largest (1 square containing the whole canvas), to the very smallest which was taken to be the detail of the very finest paintwork (which in this case was found to be a square of 0.8 mm.) The figures accrued were then used to determine the fractal dimensions of the patterns.[349] It was found that when plotted on a

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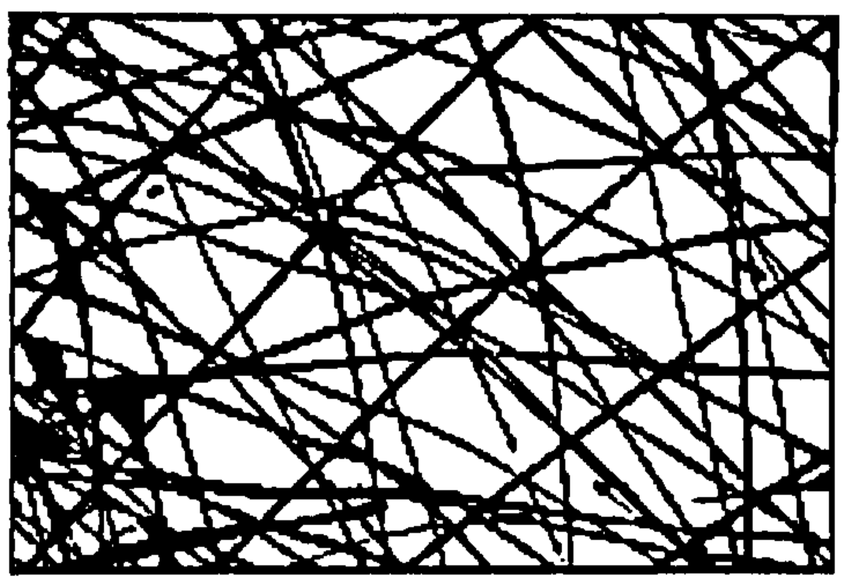
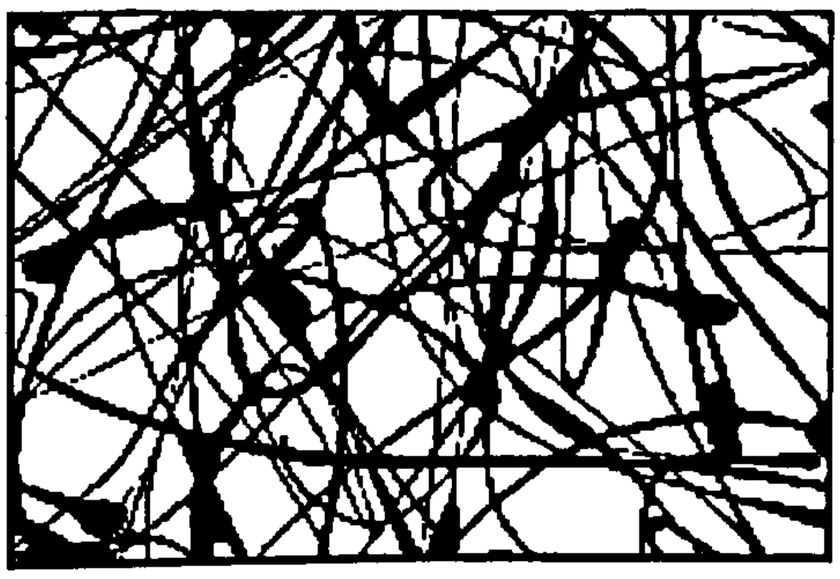
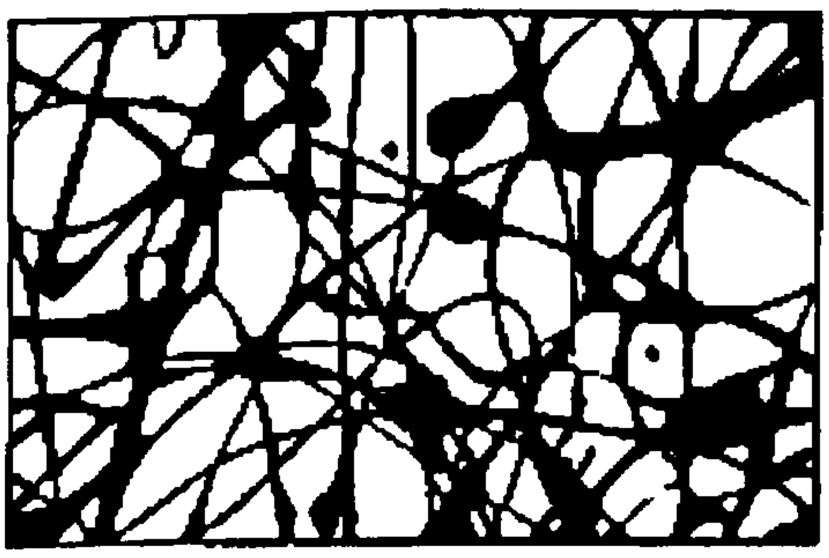
[348] Taylor, Micolich, Jonas, 'Fractal Expressionism,' *Physics World*, (vol. 12, 10, October 1999) pg. 25-28

[349] "Values of the Fractal dimension, D, are then extracted from a graph of $N(L)$ versus L using the relation $N(L) \sim L^{D}$. [Where $N(L)$ is the number of squares that contain part of the painted pattern]. The validity of this expression increases as L becomes smaller and the total number of boxes in the mesh is large enough to provide reliable counting statistics. In our measurements the total number of boxes ranges from 100 to 4 million. If the results are plotted on log-log axes, the gradient of the curve is $-D$. The straightness of the graph's curve reflects statistical self-similarity of the pattern, and the accuracy of the pattern has been confirmed by analyzing test patterns consisting of standard fractals of known dimensions."







Detail of non-chaotic (top) and chaotic (middle) drip trajectories generated by a pendulum and detail of Pollock's 'Number 14' painting from 1948 (bottom). Images from Jonas et al, 'Fractal Expressionism.'

particular graph (as shown in image on facing page) a straight line could be observed which suggests a statistical self-similarity in the pattern for different sizes of boxes. This means that the pattern is self-similar in terms of its numerical description, over different levels of magnification between 0.8mm and around 2.5 meters.

Jonas et al. found that in several of the paintings that they investigated there are two co-existent fractal patterns. This means that there are two levels of detail. Of these levels of detail both have a differing fractal dimension relative to the level of detail at which the pattern is analysed: the first pattern corresponding to the fine paintwork at a scale of between 1mm and 5 cm; and the second pattern corresponding to the broad paintwork at a scale between 5 cm and 2.5 m.[350] Both patterns can be expressed as a fractal dimension. Thus, for example, *Blue Poles Number 11* (1952), was found to demonstrate two fractal patterns, the first of which the close detail fractal, or D_d - having a value 1.72, with the larger scale pattern, or D_L having a value which was stated to be "quite close to 2." In all the paintings analysed the second, large scale, fractal was found to have a value close to 2, and the following values were found for the small-scale fractal pattern, D_d - *Untitled: Composition With Pouring II* (1943) - has a D_d value "close to 1", *Number 14, 1948* has a D_d value of 1.45 and *Autumn Rhythm: Number 30, 1950* a D_d value of 1.67.

Taylor, Micolich, Jonas, 'Fractal Expressionism,' *Physics World*, (vol. 12, 10, October 1999) pg. 25-28

350 "This fractal analysis reveals two distinct D values occurring over the ranges 1mm L < 5cm and 5 cm < L 2.5 M." from Taylor, Micolich, Jonas, 'Fractal Analysis of Pollock's Drip Paintings', *Nature*, vol 399, 3 June 1999, pg. 422.

At this point it is worth recalling that Jonas et al's self-proclaimed method of 'scientific objectivity' was applied with the promise of the holy grail of art historical investigation; namely what they claimed was the 'fundamental content' of several of Jackson Pollock's paintings produced between 1940 and 1952. This claim has lead to the conclusion that within these paintings there are fractal patterns, and that a painting such as *Autumn Rhythm: Number 30, 1950* has two fractal dimensions:

a D_d value of *1.67* and a D_L value close to 2.

This is reminiscent of the statement made by the computer Deep Thought in Douglas Adams' *Hitch-Hikers Guide to the Galaxy*, which having pondered the ultimate existential question, the meaning of life, the universe and everything, gave the answer as being 42. Upon giving the under-whelming answer the computer subsequently made the Earth as a computer to calculate the *Question* of what was the meaning of life, the universe and everything. And like Deep Thought, it would seem that if the fundamental content of *Autumn Rhythm: Number 30, 1950*, is 1.67 and nearly 2, then the questions we are asking of it need some further investigation and refinement. This question *what is being represented?* needs asking again.

In the concluding section I will revisit the question which I began this chapter with – 'What is being represented by Jackson Pollock's *Autumn Rhythm: Number 30, 1950*?'

I will provide four different responses to this question; all of which are related to the fractal forms discovered within them. Because each answer to the question engages in a different order of representation it is also functions as an analogy for the form of the fractal itself; that is as a

self-similar pattern which is manifested at different scales within the discursive system of my thesis.

1. 3 What can be observed? (1) Nature/Mimesis/Representation

Firstly it could be argued that existence of fractal patterns in Pollock's all-over canvases demonstrate that they are a representation of the natural world. As has already been observed fractal patterns occur naturally in nature (for example in bracken fronds and capillaries in the lungs.) Taylor, Micolich and Jonas note that natural fractal patterns such as coastlines and lightning display a fractal dimension of between 1.25 and 3. They also observe that systems which have two fractal dimensions, like the paintings, also display, are also naturally occurring. The examples they provide of this are "trees and bronchial systems." Thus, by illustrating fractal patterns and demonstrating such dynamic, systemic patterns as are naturally occurring, the paintings could be seen to be mimetically representative of naturally occurring dynamic systems. Hence the dynamism of the natural world is seen as re-presented within the complex artistic system supported by the canvas.

1.4 What can be observed? (2) The Fractal Itself

The second answer to the question takes a Formalist reading of the fractal patterns and suggests that what is being represented is the fractal itself. This question takes the painting as a closed system of representation gesturing toward the conceptual object of a mathematical model; the icon of which is the fractal pattern.

This second approach thus brings the response within the sphere of the claims which have been made for other fractal images. If Pollock's

paintings are fractals, then naturally it follows that what has been claimed for fractal images may be claimed for them. Fractal images provided as representations of mathematical models have been applied to an aesthetic analysis, as if they were artworks. And it has been suggested that in their graphical representation of the non-representable infinite regress of self-similarity, they might display aesthetic qualities. Certainly this is how Mandelbrot conceived of his fractal geometry, as a "world of pure plastic beauty unsuspected till now."[351] In this respect then, it could be argued that fractals provide an ultra-modernist artform; an expression of Mondrian's Pure Plastic Art. Mondrian's definition of his 'Pure Plastic Art' would indeed seem to fulfil the criteria of a fractal in so far, as he argued that:

> The important task of all art, then, is to destroy the static equilibrium by establishing a dynamic one. Non-figurative art demands an attempt of what is a consequence of this task, the destruction of particular form and the construction of a rhythm of mutual relations, of mutual forms of free lines.[352]

Following this line of argument, the self-similar, fractal patterns of *Autumn Rhythm: Number 30, 1950*, as with other visual representation of fractals (such as image of Julia set on facing page) suggest a visual system which is in a state of dynamic, non-equilibrium, and which, by virtue of its scaling self-similarity, is a "construction of a rhythm of mutual relations, of mutual forms of free lines." Couched in these terms fractals (Pollock's included) are exemplary of Modernist *Pure Plastic Art.*

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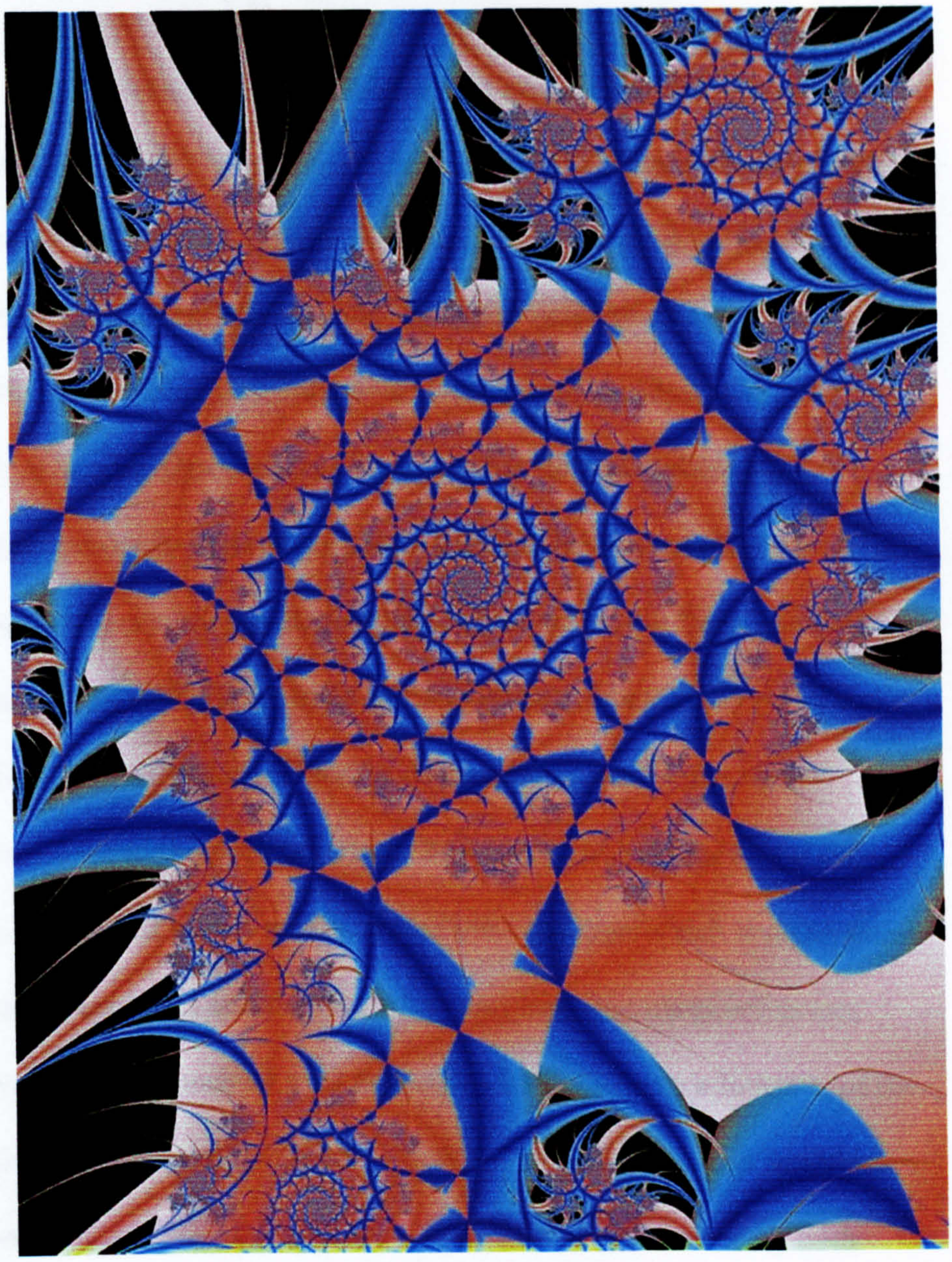
351 Mandelbrot, *The Fractal Geometry of Nature*, (W.H. Freeman and Company, 1977), Pg. 4

352 Mondrian, 'Pure Art and Pure Plastic Art' (1936), in Chipp (ed.), *Theories of Modern Art*, (University of California Press, 1968) pg. 349 ff.



A Julia Set Fractal

Developing this question further, in an article which appeared in *Modern Painters*, P.W. Atkins argued that images based upon fractals fulfilled the description of being a 'hypermodern art'. He argued that in its synthesis of aesthetic and scientific concerns the fractal could provide the conceptual basis for an art which was suitable for our technologically and scientifically advanced society. From his starting point that "it is plausible that a rigorously scientific basis of aesthetics will one day be available", he argued that aesthetic response results from the 'exposure' of the "appropriately resonant circuitry"[353] of the brain to the aesthetic object which is the focus of the aesthetic attention. Whilst, as Akins admits, such a determinist project is beyond the present state of Biological and Physical knowledge, Atkins argues that such a model of aesthetic response, which is reminiscent of Kantian aesthetics and the 'free-play' of reason and imagination can, theoretically, be conceived of in materialist terms as being a function of the organic system of consciousness. In conclusion Atkins goes on to state that because fractals are mathematically, intellectually and aesthetically both engaging and pleasing they are 'beautiful' images. This is because, he argued, "At one level the warmth of our response to it must lie in the dizzying richness of the image. A fractal image is an image without end." Fractals are, for Atkins, in their simple, yet theoretical infinite complexity "deep, inexhaustible wells of beauty."

Following this line of thought it could be argued that as fractals Pollock's paintings such as *Autumn Rhythm: Number 30, 1950* also fulfil the strictly formal (and mathematical) conditions of being "deep, inexhaustible

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353 Atkins, 'The Rose, The Lion, and the Ultimate Oyster', *Modern Painters*, (Vol.2, 4, Winter, 1989/90), pg. 50-55

wells of beauty," and are, therefore, a fulfilment of the criteria of a hypermodern art of which Atkins talks about. The logical conclusion of this would seem to suggest that if both fractals are inherently aesthetic, and the canvases are inherently fractal, then it is possible to provide an algorithm for beauty in art. At the heart of this take on fractals is the suggestion that there can be a mathematically formalised set of formal procedures (algorithms) lying at the core of the visual systems of Pure Plastic, hypermodern Art. Playing like a parody of Greenbergian formalism the conclusion would be that the hypermodern beauty of Pollock's paintings has at its core an explanation in terms of the fractal dimensions implicit in these images.

1.5 What can be observed? (3) An index of process

As Rosenberg suggested in 'The American Action Painters's (1952) one way of looking at the complex visual system of Pollock's paintings is that what is being represented on the canvas is "not a picture but an event."[354] According to this interpretation the paint on the canvas is an index of the act of its creation. It is thus representative of Pollock's movements around the canvas and it serves as a visual record of not only his own movements around the canvas but also the application of the paint itself whether it was placed by Pollock or let to fall by its own devices. That this index of creation and the application of the paint is Fractal suggest that the way in which the paint fell was chaotic and hence dynamic in its nature in the

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354 Rosenberg, 'American Action Painters,' in Harrison & Wood, *Art in Theory 1900-1990*, (Blackwell, 1991)

same way that other natural process can be modelled using the visual analogue of the fractal.[355]

As already noted in the paintings analysed by Taylor, Jonas and Micholich two fractal dimensions were identified, corresponding to two different types of patterns. If these patterns are, as has been suggested, an index of process, then it can also be shown that these two fractal patterns correspond to different working procedures. Taylor, Jonas and Micholich acknowledge this and suggest that the two fractal dimensions represent the following:

(i) An all-over, large-scale pattern which could be seen as the visual scaffolding of the paintings. This corresponds to Pollock's movement around the canvas. This pattern was identified as having a fractal dimension of "nearly 2." Significantly this figure is the same for the larger pattern in all of the canvases which were analysed. This suggests that a similar process was being employed each time. This pattern is the anchor layer of the painting, upon which the complete pattern is built upon, around and within.

(ii) A smaller scale fractal pattern which fills in the detail of the scaffolding of the anchor layer. This pattern is an index of a finer, more detailed working approach which concentrates upon particular areas of the canvas at any one time (as opposed to the anchor layer which involves working on the canvas as a whole.) It is suggested that this pattern is the *detail* layer of the painting. Taylor, Jonas and Micholich claim that this smaller scale

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355 Whirlpools and sand piles are two such examples discussed by Buchanan, in *Ubiquity* (Wiedenfeld and Nicolson, 2000)

pattern represents Pollock's dripping technique which was 'refined'

between the years 1943 - 1952. And they have stated that:

> Our analysis shows that Pollock refined his dripping technique: the fractal dimensions increased steadily through the years from close to 1 in 1943 to 1.72 in 1952.[356]

They argued that this increase in the fractal dimension, which means simply that the pattern became more expansive, meant that the pattern of this detail layer became more dense in Pollock's later abstract work. This could be used, therefore, they argue as a legitimate art historical technique. They state that the: "fractal analysis could be used as a quantitative, objective technique both to validate and date Pollock's drip paintings."[357]

The claim that these two fractal patterns inherent in Pollock's visual systems correspond to different working practice can be validated by looking at accounts of Pollock's method of working on the abstract canvases. These accounts corroborate the argument that the patterns are visual indicators of the dynamic events of their creation. First hand accounts of Pollock at work by Goodnought, Namuth (who filmed Pollock) and Karmel[358] (who has produced an exhaustive study based upon Namuth's films and other accounts of Pollock at work) demonstrate on one hand Pollock's broad approach to the whole canvas (corresponding to the fractal of the anchor layers); and his more detailed close working of the canvas (corresponding to fractal the detail layers.)

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356 Taylor, Micolich, Jonas, 'Fractal Analysis of Pollock's Drip Paintings', *Nature*, vol 399, 3 June 1999, pg. 422.
357Taylor, Micolich, Jonas, 'Fractal Analysis of Pollock's Drip Paintings', *Nature*, vol 399, 3 June 1999, pg. 422.
358 All quoted in Pepe Karmel, 'Pollock at work: The Films and Photographs of Hans Namuth,' In: Varnedoe with Karmel, *Jackson Pollock*, (The Museum of Modern Art, 1998)

The accounts of the processes involved in the creation of *Autumn Rhythm: Number 30, 1950* demonstrate this. In an article which first appeared in *Art News* in 1951, Goodnought gave the following description of Pollock's method.

> At the start of the process Pollock began with a blank, clean canvas, which, Goodnought observed, was worked in a period of intense and absorbing activity (about 2 hours) at the end of which Pollock was "completely exhausted."
>
> > After a while he took a can of black enamel... and a stubby brush which he dipped into the paint and then began to move his arm rhythmically about, letting the paint fall in a variety of movements on the surface. At times he would crouch, holding the brush close to the canvas, and again he would stand and move around it or step on it to reach to the middle. Within half an hour the entire surface had taken on an activity of weaving rhythms... As he continued, still with black, going back over former areas, rhythms were intensified with counteracting movements.[359]

Then, Goodnought related, Pollock would spend two weeks becoming accustomed to the painting, after which he would sporadically apply different layers of paint to the canvas in a more deliberate fashion. The third and final working of the canvas, some weeks after the initial act of construction is described by Goodnought in terms which are instructive. This process was described as being:

> "Slow and deliberate. The design had become *exceedingly complex* and had to be brought to a state of complete organization."[360]

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[359] Pepe Karmel, 'Pollock at work: The Films and Photographs of Hans Namuth,' In: Varnedoe with Karmel, *Jackson Pollock*, (The Museum of Modern Art, 1998)
[360] Goodnought quoted in Karmel, (1998) (pg. 95) Emphasis added.

Whilst Karmal discusses inconsistencies with Goodnought's account, it is clear nonetheless that Pollock did work at different levels of intensity at different periods of time until the canvas as a whole was left.

Goodnought's identification of three types of activity (the initial work, the complementary changes and the final, close detailing) this would, therefore correspond with Taylor, Jonas and Micholich's argument that the different fractal dimensions represent different working processes; on the one hand a canvas-wide action, and on the other a closer detailing of the pattern.

Karmel also provides evidence of this taken from his close scrutiny of the two films Namuth made of Pollock at work. To demonstrate this Karmel uses some of Namuth's colour film out-takes from the filming of Pollock working on a now lost painting made on red canvas. Karmel suggests that this footage refutes the idea that the paint is applied rapidly at random, but is instead he says a

> Step by step evolution of the painting from bare canvas to *a complex web*,' which, demonstrates Pollock's, non-random, 'combination of kinetic freedom and formal control.[361]

As Karmel also observes with reference to one sequence of film:

> A close look at several frames [of the film] sequence underscores the fact that the *splats are produced by a different hand motion than the initial curve*s. After taking the brush from the paint can, Pollock lifts his hand and bends the brush inward, toward his body; he then snaps his forearm downward, finishing with his palm down rather than up. It is the same gesture of wind-up and release visible in some of the still photographs of Pollock working on *Autumn Rhythm*.[362]

Such a working method is also seen in the section of the second film where Pollock paints onto glass, with the camera beneath.

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361 Ibid.

362 Karmel, (1998) pg. 114

There are two important parts of this statement. Firstly the observation that there is visual evidence of Pollock's differing techniques which again corroborates the argument that the two fractal patterns correspond to two differing types of activity. And secondly there is the observation that Pollock used the same type of motions between canvases (in this case the lost, red canvas painting and *Autumn Rhythm: Number 30, 1950* - which was subjected to fractal analysis.) This further confirms the argument that there is a fractal similarity shared between (a selection of) the canvases.

1.6 What can be observed? (4) A different scale of observation

There is a self-similarity in the three arguments given above for what is being represented in Pollock's work.

In all of the three arguments above Pollock's abstract canvases are *saved* from the irrationality of abstraction through the work being observed as representing the concept of 'system.'

Through the discovery of fractal patterns within them they are seen to demonstrate meaning through being representative in some form; be this literally, conceptually or visually.

Firstly is was suggested that the fractal patterns are representative of nature by being mimetic of abstract, dynamic or natural systems.

Secondly it was suggested that the fractal patterns are representative of a conceptual ideal, of a way of visualising infinite self-similarity and that art using them was therefore a hypermodern artform that has certain inherent aesthetic qualities.

Thirdly it was suggested that the fractal patterns are representative of the process of their creation - that they a dynamic, visual system which is an index of the patterns of the non-periodic repetitions of their genesis.

Yet all of these self-similar acts of representation are founded on paradox.

All three are answers to the question of what is being represented in the fractal forms discovered in the visual systems of the paintings. The self-contradiction here is that these abstract paintings only become representative by being abstract. This is because it is only through the establishment of the fractal as the figure, differentiated from the ground of the canvas, that they are seen as being representative of the abstract, dynamic (and natural) systemic patterns as they are re-presented upon the canvas and within the picture space.

This paradox is illustrated further by a particular example from Karmel. Having undergone an exhaustive analysis of Pollock's painting methods through close observation of Namuth's films of Pollock at work (using, amongst other methods, computer reconstructions of whole canvases from filmed parts), Karmel finds an initial figurative order to Pollock's visual system. In contrast to Goodnought's account of Pollock's tri-partite working method, Karmel suggests the work has four stages with the first, intense period of activity being split into two also distinct actions. Firstly there was an initial tracing of calligraphic and loosely representational figures (clearly distinct from the ground) followed by the second task of immediate over-painting and obscuring of these figures.

In one example, *number 27, 1950*, the painting was begun with black lines, and a series of loose arcs which are vaguely descriptive of the Picasso-esque motifs which appear elsewhere in Pollock's work. Karmel has related this inception of the work:

> Watching from above, we see a hand extend a paint-clotted brush a few inches above the bare canvas. A black line appears on the white surface below it. As the brush moves through the air, the line swerves to the left, curves upward, and then loops to the right, forming a pumpkin shaped ovoid. Narrow, then thick, then narrow again, it terminates in a pair of tiny blots connected by a stem; a miniature barbell with one end light and the other dark.....
>
> In the following nine seconds, Pollock adds a series of lines describing the contours of a figure unmistakably similar to the figures in earlier pictures such as *Untitled (Cut Out)* (1948). One line curves upward on the left to form a shoulder then turns down and right to make an arm, terminating in calligraphic fingers. A second line rises from the left corner of the canvas to describe a foot and a leg. A third descends on the right, bending at the knee. A fourth is bent into a foot, shaped like a triangular shirt hanger. Moving right, Pollock begins a second figure, working upward this time instead of down.[363]

Having stated this Karmel argues next that the randomness of Pollock's painting in the second half of this first stage obscures this initial representational aspect of the picture. Through this, he continued:

> This is the point at which the painting is transformed from a collection of independent pictographs into a single all-over composition united by a consistent rhythm of dark and light, thick and thin extending across the surface.[364]

Thus, and herein lies an irony, the point at which the painting becomes a chaotic and dynamic visual system, represented through the inherent fractal patterns, is the point at which traditional visual representation breaks down and the distinction between figure and ground is obscured. Thus it is that

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363 Karmel, 'Pollock at Work: The Films and Photographs of Hans Namuth,' In *Jackson Pollock: New Approaches*, (MOMA, 2000), pg. 107
364 Karmel, Ibid.

the point at which the question - *what is being represented?* becomes impossible to answer in one way it emerges in another. This is because the point of abstraction is the point at which the fractal figure emerges from the ground. And this figure itself serves a representative function as we have seen above. By being non-representative, the paintings end up becoming representative again on a different scale.

In conclusion the argument is moved on to another scale within the discursive system of the thesis. In doing so another order of question is also addressed and other, self-similar, acts of representation are questioned.

These acts of representation concerns what a Jackson Pollock itself might represent within other, larger scale systems of representation of a different order; that is *distributed representation* as outlined in the preceding chapter. I refer here to what the work of art itself represents within other complex distributed systems within which art occurs. These other systems include: the financial systems of the art market; the systems of display and archiving of the gallery and the discursive systems of art writing and art history and the museum amongst other *artworld* (to adopt a phrase from the Institutional Theory of Art) systems. Finally it is argued that it is by observing these self-similar acts of *distributed representation* which occur across the different complex systems of the artworld that a more satisfactory answer to the question *what is being represented* can be engaged by asking instead: *what can be observed?* In the remaining arguments of the thesis I attempt this. Firstly within this chapter where I conclude that *Spiral Jetty* is an art work which is a complex, distributed system. And in the following chapters I look at other distributed systems art.

2 – The Complex, Distributed System of *Spiral Jetty*

As I discussed from personal experience in the opening chapter, *Spiral Jetty* is an unstable and chaotic work both physically and conceptually. Further, its physical intransigence serves as a powerful metaphor for its shifting conceptual identify. It is this ambiguous identity which presents a challenge in determining what is being represented in the work. And there are different conceptual scales at which the work can be observed.

Robert Hobbs gave the following physical description of the sculptural aspect of *Spiral Jetty* as: "Spiral Jetty, Rozel Point, Great Salt Lake, Utah, April 1970; Mud, precipitated salt crystals, rocks, water; coil 1500 ft long and 15 ft wide."[365]

But there is more to *Spiral Jetty* than its physical constitution. *Spiral Jetty* is a complex work. Different aspects of it include:

(i) The Sculpture in the Salt Lake, which Smithson completed in 1970

(ii) the 35 minute 16mm film which Smithson made

(iii) the Essay Smithson wrote about the work

(iv) the photographs taken by Smithson and Gianfranco Gorgoni of the work and its creation

(v) the sketches Smithson made in preparation

(vi) the performance of the work's creation

(vii) the subsequent discourse which surrounds the work

and so on, and so on.

Smithson himself acknowledged the instability of the work in his concept of the site/non-site dichotomy; an unstable interconnection of

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[365] Hobbs, *Robert Smithson; Sculpture*, (1981, Cornell University Press) pg. 191

cross-reference which he explored in his work[366]. He defined non-site in the following terms:

> *The non-site an (indoor earthwork)* is a three dimensional logical picture that is *abstract* yet it represents an actual site... To understand this language of sites is to appreciate the metaphor between the syntactical construct and the complex of ideas, letting the former function as a three dimensional picture which doesn't look like a picture... Between the actual site ...and *The Non-Site* itself exists a space of metaphorical significance. It could be that 'travel' in this space is a vast metaphor. Everything between the two sites could become physical metaphorical material devoid of natural meanings and realistic assumptions.[367]

Initially it seems that in the concept of the *non-site* that Smithson proposes is merely a replication of the notion of representation which is critiqued from a systems-theoretical perspective. This is because it is a 'logical picture' (normally in sculptural form; incorporating material from the site) that 'represents' the site; thus preserving the structural relationship between signifier and signified upon which non-distributed representation is founded. However it subverts this by the site being interconnected with the non-site; both of which are in a paradoxical yet symbiotic processes of fulfilment and negation. As Smithson said of this negation:

> In the very name 'non-site' you're making a reference to a particular site but that particular site evades itself, or it's incognito. You're on your own. You're groping out there. There's no way to find out what's there. Yet you're directed out there. The location is held in suspense. The non-site itself tends to cancel out the site. Although it's in the physical world, it's not there.[368]

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366 Smithson produced a series of *non-sites* including, *A Non-site, Pine Barrens, New Jersey*, [a sculpture of blue aluminium boxes containing sand from the site accompanied by a aerial photograph/map of the site in New Jersey] (Winter 1968; Virginia Dwan); and *A Non-site, Franklin, New Jersey*, [a sculpture of wood boxes filled with limestone from the site with accompanying map,] (Summer, 1968; Museum of Contemporary Art; Chicago)

367 Smithson, 'A Provisional Theory of Non-sites,' (1968), in Robert Smithson, (ed. Flam), *The Collected Writings*, (University of California Press, 1996,) pg. 364

368 Robert Smithson on conversation in, 'Four Conversations between Dennis Wheeler and Robert Smithson, (1969-70)" in: Smithson, (ed. Flam,) *Robert Smithson: The Collected Writings*, (University of California Press, 1992),

This is to say that even though the *site* is incomplete without its complementary counterpart it is simultaneously negated and effaced by the presence of the non-site (and likewise the non-site is both fulfilled and negated by the site). Smithson talked about the site/non-site in such terms:

> There's a central focus point which is the non-site; the site is the unfocused fringe where your mind loses its boundaries and a sense of the oceanic pervades as it were. I like the idea of quiet catastrophes taking place.... The interesting thing about the site is that, unlike the non-site, it throws you onto the fringes. In other words, there's nothing to grasp onto except the cinders and there's no way of focusing on a particular place. One might even say that the place has absconded or been lost. This is a map that will take you somewhere, but when you get there you won't really know where you are. In a sense the non-site is the centre of the system, and the site itself is the fringe or the edge.[369]

Right, because also the site isn't there. Here you are confronted with both a mental and a physical manifestation that purports not to be there, so that's an effacement through the physical properties of both mind and matter. In other words, in the non-site idea here is this container and it has the limit of my mental experience plus the physical point.[370]

In *Spiral Jetty* the complex of sites (and non-sites) which offer themselves up for *observation* the ambiguity of which of the various aspects of the system to be prioritised becomes the central feature of the work. As Owens has observed:

> Like the nonsite the Jetty is not a discreet work, but one link in a chain of signifiers which summon and refer to one another in a dizzying spiral. For where else does the Jetty exist except in the film which Smithson made, the narrative he published, the photographs which accompany that narrative, and the various maps, diagrams, drawings, etc. , he made about it? Unintelligible at close range, the spiral form of the Jetty is completely intuitable only from a distance, and that distance is most often achieved by imposing a

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[369] Robert Smithson in conversation in, 'Discussions with Heizer, Oppenheim, Smithson, (1970), in: Smithson, (ed. Flam,) *Robert Smithson: The Collected Writings*, (University of California Press, 1992), pg. 249

[370] Robert Smithson in conversation in, 'Four Conversations between Dennis Wheeler and Robert Smithson, (1969-70)" in: Smithson, (ed. Flam,) *Robert Smithson: The Collected Writings*, (University of California Press, 1992), pg. 204

text between viewer and work... That Smithson thus transformed the visual field into a textual one represents one of the most significant aesthetic "events" of our decade; and the publication of his collected writings constitutes a challenge to criticism to come to terms with the textual nature of his work, and of postmodernism in general. That challenge is formidable, since it requires the jettisoning of most of our received notions about art; it can only be acknowledged here.[371]

Given this complexity the key questions to ask of this complex system - *Spiral Jetty* are the questions that were also raised in the preceding concerning representation and the work of Jackson Pollock. Therefore the significant question to ask of the work is not only *what is being represented;* but also *how is the work representing;* and also further *how is the work itself observed* from within particular discursive systems?

Spiral Jetty is observed as a complex system in so far as it is a System defined by Ackoff in 1960 as:

> The term system is used to cover a wide range of phenomena. We speak, for example, of philosophical systems, number systems, communication systems, control systems, educational systems, and weapon systems. Some of these are conceptual constructs and others are physical entities. Initially we can define a system broadly as any entity, conceptual or physical, which consists of interdependent parts. Even without further refinement of this definition it is clear that in systems research we are interested only in those systems which can display activity - that is behavioural systems.
>
> The essential characteristic of a behavioural system is that it consists of parts each of which displays behaviour. Whether or not an entity with parts is considered as a system depends on whether or not we are concerned with the behaviour of the parts and their interactions.[372]

Further, *Spiral Jetty* is identified as a complex system in so far as it is complex as Luhmann defined it:

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371 Craig Owens, 'Earthwords', *Beyond Recognition*, (University of California Press, 1992), pg. 47

372 Ackoff, 'Systems, Organizations, and interdisciplinary Research', *General Systems Yearbook*, vol. 5 (Society for General Systems Research, 1960), p3

> When the number of elements that must be held together in a system or for a system as its environment increases, one very quickly encounters a threshold where it is no longer possible to relate every element to every other one. A definition of complexity follows from this: we will call an interconnected collection of elements 'complex' when, because of immanent constraints in the elements' connective capacity, it is no longer possible at any moment to connect every element with every other element. The concept of 'immanent constraint' refers to the internal complexity of the elements, which is not yet at the systems disposal, yet which makes possible their 'capacity for unity'. In this respect, complexity is a self-conditioning state of affairs; the fact that elements must already be constituted as complex in order to function as a unity for higher levels of system formation limits their connective capacity and thus reproduces complexity as an unavoidable condition on every higher level of system formation. Leaping ahead, we may hint at the fact that this self-reference of complexity is then 'internalised' as the self-reference of systems.[373]

This idea that it is impossible to relate every element to every other one except by virtue of their interconnectedness suggests that complexity is about the unity of system as a whole which is of greater conceptual significance than the sum of the parts.

In other words a complex system demonstrates behaviour which is unpredictable and which can't be quantified by an atomic analysis of the separate constituent parts of the system as discreet elements. Thus the whole of the system is a separate theoretical entity which cannot be described purely in terms of its interactions of interconnected parts. This is the idea that complex system display emergent properties which arise from out of their structural organisation.

In 1972 the brackish waters of the salt lake submerged the *Spiral Jetty*. And so I come back (again) to the question where I began - does *Spiral Jetty* still exist? And as I also posed at the outset this question can be

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373 Luhmann, *Social Systems* (trans. Bednarz Jr. & Baecker) (Stanford University Press, 1995) pg. 24

couched not only in terms of representation but the systems-theoretical terms of *distributed representation* and *observation* too. In other words the complex system *Spiral Jetty* can be observed in relation to the following questions:

(i) What is being represented?

(ii) How is the work representing?

(iii) How is the work itself represented? And to answer this question attention needs to be focused away from the work onto the institutional systems within which it circulates. It is to a systems-theoretical analysis of these systems that the remaining chapters of my thesis is directed.

As I outlined in the discussion on *distributed representation* in complex systems representations are distributed over the whole system, and do not reside in a single part of the system. Hence in cognitive models of the mind as connectionist/distributed system demonstrate memory in a connectionist manner. This means that if part of the brain destroyed this doesn't correspond to the loss of a particular memory. Instead due to distributed nature of the representations when damaged distributed systems display what is know as 'gentle degradation' of their representations. Following from this it is argued that despite its physical degradation the complex system of *Spiral Jetty* can still be observed via the systems across which its representation is distributed. And this means that when we 'look' for *Spiral Jetty* we need to provide a context for our observations. One sense might not be enough. Or - as Coveney and Highfield state in their book *Frontiers of Complexity* – "In order to

understand the value of money, we shouldn't stare at dollar bills."[374]

[374] Coveney & Highfield, *Frontiers of Complexity*, (Ballantine Books, 1995) pg. 320

CHAPTER 6

THE SYSTEMS THEORETICAL PERSPECTIVE AND THE GALLERY SYSTEM

Introduction

In this chapter I identify that the systems of display and preservation of art are complex systems. In doing so I apply two key systems-theoretical concepts to the systems of the art gallery. These concepts are:

1) Complex systems are *distributed* systems of representation. That is that the representations associated with such systems are *distributed* across the entire system. In the case of the art gallery I argue that is demonstrated by the concept of art itself being understood as a function of a representation which is distributed throughout the gallery system.[375] In this respect I argue that the Institutional Theory of Art as formalised by Danto et al can be restated from a systems-theoretical perspective.

2) Complex systems display the behaviour of positive feedback. That is they become 'locked-in' around particular patterns of behaviour. In the cases of the gallery systems outlined below I argue that when this complex systemic 'locking-in' is manifested in cultural systems it leads to the 'locking-in' of certain cultural tropes. In other words the systems-theoretical principle of positive-feedback and irreversibility leading to a 'lock-in' within complex systems can be used to explain patterns of cultural inertia and structures of social hegemony.

In order to demonstrate more thoroughly the systems-theoretical concept of 'lock-in' I provide a discussion of positive-feedback, irreversibility and lock-in as it was used by W. Brian Arthur to explain the development of the VHS/Betamax video market which became 'locked-in' around VHS as the dominant (but not necessarily technologically superior)

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375 It is also noted that the gallery system refers to both the individual gallery space and also the worldwide network of galleries of which individual galleries are a subsystem.

format. My conclusion is that the complex systems of the display, preservation and archiving of art can also be said to display isomorphic, complex 'locking-in.'

Further it is also noted that in the spirit of the thesis as a whole – namely that isomorphisms can be identified across a wide variety of complex systems - the arguments in this chapter concerning the art gallery/museum as a complex system can also be applied to Art History as a complex system. And in the chapter immediately following this one I argue that, like an art gallery, the Museum of Language which is Art History is also a complex, distributed representational system which is 'locked-in' around certain patterns of behaviour, cultural tropes and social hegemonies.

1 – The Genuine Fakes

What follows in this chapter section is a cautionary tale for revisionist art-historians; be careful not to break the law.

On Friday February 12th 1999 Judge Geoffrey Rivlin convicted John Drewe of conspiracy to defraud, forgery, theft and using a false instrument with intent. The following Monday he was sentenced for 6 years, a sentence which he continues to serve in Pentonville prison. The severity of his crime was deemed to be so grave that Detective Sergeant Jonathan Searle of the Organised Crime Squad was moved to state that:

"The World will be a much safer place with Drewe in jail. It is a relief to know this man will now face the justice he deserves."[376]

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376 Amelia Gentleman, 'Fakes leave art world in chaos', *The Guardian*, Saturday, Feb. 13, 1999, pg. 10

Top - Real Giacometti: (Nimatallah/Art Resource, NY, Copyright ARS, NY)
Bottom - Fake Giacometti: (Photonews Service/Old Bailey)

Drewe's allegedly heinous crime which was identified as such an affront to decent humanity is something which all of us art-historians should be vigilant of. "Anything he has touched becomes suspect," Detective Sergeant Searle elaborated, "He has rewritten art history."[377]

Drewe had apparently made art out of nothing. His rewriting of art history was deemed to be criminal because he had seemingly created works of art where none should have existed. He was punished because he had tampered with the complex internal workings of the gallery system and its archive. He had, in short, been able to alter what was being represented as Art by this complex system.

The story began in 1987 with an advertisement placed by the painter John Myatt in the back of *Private Eye*. Myatt advertised his services as offering: "Genuine fakes. Nineteenth and twentieth century paintings from £150. Phone [...]"[378]

Since 1981 the painter Myatt had earned a humble living by counterfeiting artworks in a variety of Modern styles, as he himself explained:

> Quite a few people wanted impressionist paintings. The only thing I avoided as Pre-Raphaelite work, because it was too detailed and took too long.[379]

Myatt's work was also characterised by his use of cheap materials which are easily available from hardware stores. His 'genuine fakes' were

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377 Amelia Gentleman, 'Fakes leave art world in chaos', *The Guardian*, Saturday, Feb. 13, 1999, pg. 10

378 Amelia Gentleman, 'Fakes leave art world in chaos', *The Guardian*, Saturday, Feb. 13, 1999, pg. 10

379 Jay Rayner, 'The Fake's Progress,' *Observer Review*, (Observer, July 4th, 1999,) pg. 7

made using Leyland trade paints (emulsion), petroleum jelly and powder paint.

When Drewe contacted Myatt the counterfeit and fraud partnership began. Firstly Drewe asked Myatt to paint a Matisse-style painting. Satisfied with the result he then requested several other styles of Modernist painting, leaving Myatt free to choose artist and style.

Later that year Drewe took a counterfeit Gleizes to an auctioneer[380] who identified the Cubist work to be either a Gleizes or after Gleizes and valued the work at £12,500. This set the whole process in action with Myatt producing his genuine emulsion fakes and Drewe circulating them within the systems of the artworld. At the trial the jury heard that by the time the partnership were apprehended, in 1995, Myatt had created by his own estimate more than 180 fakes. It was also estimated that Drewe may have earned more than £ 2.5 million from his conspiracy.

The problem which Drewe presented to the system of the Artworld, and presumably the reason as to why it was alleged that the world is now a 'much safer place' with his subsequent incarceration, is the way in which he gained credibility for his fakes. A question mark still hangs over the whereabouts of all the genuine fakes and just how much money was made. As Detective Constable Micky Volpe has said: "The corruption which has taken place of the national archive of contemporary art has been considerable."[381] And it may be that there are still Drewe and Myatt's simulacral art works are still being circulated around the circuits and systems of the Artworld.

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380 Identified by *The New York Times Magazine* as working for Christies. [REF.]
381 Amelia Gentleman, 'Fakes leave art world in chaos', *The Guardian*, Saturday, Feb. 13, 1999, pg. 10

1.1 Representation and *Dirty* Data

I argued that the plausibility of Drewe's simulacral art works can be explained by the ways in which the art gallery system represents works of art; that is as a complex system of *distributed* representation. The confidence trick worked because Drewe was able to redirect information and thus provide opportunities for the genuine fakes to be represented over the gallery system as authentic. This was achieved by creating false provenances for the genuine fakes. I will now outline how this 'false' representation was made possible.

As the agent by which the genuine fakes entered into circulation in the artworld system the first thing that Drewe needed to do was to draw attention away from himself. To do this Drewe created false owners like Daniel Stoakes who he coerced into selling paintings for him and who himself faced trial at the time for his involvement. Whilst Stoakes was a real person, hoodwinked into the fraud as a front for false provenaces and sales, another 'owner', Len Martin, never even existed. Using correspondence with a professor of physics at Kiel University, in Germany, called H. Heinrich Martin Drewe reconstructed letters of authentication using Professor Martin's signature. Prosecutor John Bevan QC explained:

> What he did was take an original document from a solicitor's, skillfully cut-and-pasted it, whited out the lines, photocopied it, copied it again. There you are, a lovely official document: 'To Whom It May Concern, this letter confirms the painting by Giacometti is being sold with the full authority of the owner.' This letter is signed by the owner of the Giacometti, Len Martin. Len Martin doesn't exist.[382]

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382 Peter Landesman, 'A 20th Century Master Scam', *New York Times Magazine*, (July 18th 1999.)

Drewe then approached the Institute of Contemporary Arts in London and donated two forgeries, a Le Corbusier and the Giacometti, to be sold at an auction to raise funds. Given the apparent generosity of his gifts the scrutiny directed toward both himself and the art works was less strict. The gifts meant that Drewe was able to pose as a patron with a particular interest in the institution; he was thus able to gain access to the archives at the I.C.A. and he was given a key to the library. Drewe made a similar offer to the Tate gallery and offered it a pair of forged paintings apparently by Bissire. Again there seemed to be an equal desire for accepting the works as a genuine act of generosity. However when the paintings were shown to Bissire's son he threw the works' authenticity into doubt by questioning the materials used. In order to avoid a potentially difficult situation as the Tate stalled on accepting the work Drewe withdrew the paintings in favour of a £20,000 cash donation. Again Drewe used the gift in order to pose as a someone with a serious interest in the archive (the Tate funds were offered to support the upkeep of the catalogue,) and again Drewe used the gifts as leverage to apply for access to the archives to which the Tate readily agreed. Drewe demonstrated similar duplicity to gain access to a third archive - the Victoria and Albert's National Art Library. In his application for access Drewe listed himself as 'professor of physics,' an identity which he had travelled under for some time. He listed his own address as the contact for a character reference for 'Dr. John Cockett,' a fictional character of his own creation; and when The National Art Library requested a reference Drewe wrote his own - 'John Drewe is a man of integrity,' he wrote and signed it 'John Crockett.'

Drewe used his access to the archives to aid his fraud. In the police reports of the case it was found that Drewe had used his access to the I.C.A. archives, where he was given a key to the library, to create false provenances for the works and paperwork bearing the I.C.A. letterhead. Correspondence from their archives featured in some of the false evidence which Drewe used to support the sale of the genuine fakes. In the National Art Library at the Victoria and Albert Museum Drewe also doctored the archives. One example involved the counterfeit Giacommetti first offered to the Tate which he validated by altering an old catalogue. Taking a catalogue from 1955 of an exhibition called "Exhibition of Paintings, Sculpture and Stage Designs by Members of the Entertainment World," at the Ohana Gallery in London, Drewe reprinted several of the pages of the publication to make it appear that his own genuine fakes had been on display at the exhibition (including with the fake Giacometti and some counterfeit works supposedly by Chagall, Dubuffet, de Stael and Nicholson.) He then placed his own pages (which he had printed on a computer and aged accordingly) into the catalogue and re-stitched the catalogue binding thus creating a permanent archival record of the existence of the genuine fakes which could be used to validate sales. A similar level of tampering is believed to have taken place at the Tate; and when detectives first raided Drewe's house on April 6th 1996 they found several rubber stamps of authentication bearing the Tate seal.

Drewe's fake documentation proved to be highly plausible even when used to support a lacklustre artwork. As Peter Landesman observed:

> Alan Bowness, former head of the Tate and the son-in-law of Ben Nicholson, was fooled into authenticating two of Myatt's fake Nicholsons, not because the pictures were good - in fact, the

> general consensus was that they were unimpressive at best - but because the provenancing was flawless.[383]

In addition to his contamination of documented evidence for the existence of the forgeries Drewe also set up his own validation agency called Art Research Associates which offered a professional provenance checking service. One New York dealer had obtained the 'genuine-fake' Giacometti (for $175,000) but was having trouble selling the painting on as the Alberto et Annette Giacometti Association under the directorship of Lisa Palmer refused to vouch for the work. Via a middle man (an accomplice of Drewe's who posed as a representative of the Art Research Associates) the dealer was put in touch with Drewe. Posing as an expert and calling himself Professor Drewe, Drewe was then able to show the dealer the faked Ohana gallery catalogue in the National Art Library which included black and white photographs which proved the paintings was genuine. Further evidence included faked letters from owners who had never existed and many counterfeit bills of sale which charted a virtual history of the work throughout its circulation within the system of the artworld. In support the Art Research Associates produced a report in which it was claimed that the painting had been 'thoroughly investigated' some months previously at that subsequently, 'the provenance of this painting is not in question.' The dealer was subsequently convinced.

It is therefore argued that galleries and their archives are complex representational systems and that Drewe had corrupted these gallery systems with the corrupted or *dirty* data which mis-attributed works of art.

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383 Peter Landesman, 'A 20th Century Master Scam', *New York Times Magazine*, (July 18th 1999.)

In doing so, I argue, he was able to exert an influence over the representative function of these complex systems. In short he was able to make these systems represent his own fakes as genuine.

It has been estimated that of the approximately two hundred work painted by Myatt and circulated by Drewe the whereabouts of only 73 are known, The rest are still in circulation in the art world; being bought, sold, gazed upon and consumed.

It is further observed that the phenomenon of the 'genuine fake' is not particular to this particular case. It has been claimed that between 10 and 40 percent of pictures by major artists are faked or have been restored to such an extent that they are what can be deemed the equivalent of a fake.[384][385] Landesman has observed that:

> One of a number of reputable West End dealers drawn into [the Drewe and Myatt] scam, who demanded anonymity, claims that 15 percent of sales at auction houses are fake. Thomas Hoving, former director of the Metropolitan Museum of Art, has said that during his tenure, a full 40 percent of the artworks considered for purchase by the museum were phony or overrestored. Geraldine Norman, the British art journalist credited with exposing Keating and Hebborn, says that at least 10 percent of the pictures purportedly made by major Impressionists are fake. Some experts say that as much as 60 percent of the Giacomettis on the market are fake, at least in part as a result of Drewe's con. Forty percent of pictures supposedly from the Russian avant-garde era are almost certainly forgeries. The widows of Modigliani and Chagall were accused of selling certificates of authentication. Salvador Dali, lying on his deathbed in a stupor, is said to have been fed thousands of sheets of blank paper to sign for fake lithographs. In a grotesquely sad twist, the Italian painter Giorgio de Chirico was caught back-

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384 Peter Landesman, 'A 20th Century Master Scam', *New York Times Magazine*, (July 18th 1999.)

385 It might also be the cases that the easy acceptance the genuine fakes was made increasingly possible by the climate of credibility created by the boom in the art market of the 1980's. Given the value of art as a commodity people were all too to buy art and sell any art. It didn't really matter what it was as long as someone wanted to buy and someone wanted to sell.

> dating new pictures to a time, 20 years previously, when his work was popular and in heavy demand, in effect forging himself.[386]

In conclusion of this section I argue that the claim that Myatt/Drewe's 'genuine fakes' are artworks which are fake yet which pose as genuine is an oversimplification of the complex representation which has taken place. This is because it leaves the problem of identifying what distinguishes the genuine from the fake as unanswered except in rigidly material terms alone (and that such materialism on its own is an unsatisfactory art historical tool not least because it fails to account for more recent artistic practice such as conceptual art and the 'dematerialised' art object of the 2nd half of the 20th century.) What is instead suggested is that the undiscovered genuine fakes are represented by the complex systems of the artworld in exactly the same way as other genuine works. In other words the 'genuine fakes' are not simulacral artworks masquerading as the real thing; instead they *are* the real thing and this can be demonstrated by looking at the ways in which they are being bought, sold, gazed upon and consumed accordingly. This is a further articulation of a key theme of the 2nd half of thesis (regarding the application the systems-theoretical approach to the arguments of the Institutional Theory of Art and using it to provide a plausible ontology of art in terms of as a representation within the various and interconnected complex systems of the art world.) It is argued that Art is not dependent upon a category of material existence but rather is relative to an act of representation or

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386 Peter Landesman, 'A 20th Century Master Scam', *New York Times Magazine*, (July 18th 1999.)

observation; and hence relative to the system of representation (or obserevation.) I discuss this in more detail below.

2 - Locked In: The Art Gallery and Positive Feedback

Having identified that the Drewe/ Myatt case demonstrates how the art gallery is a system of representation it is also stated that this brings it within the sphere of arguments common to *Institutional Theory of Art* (as outlined in the Introduction to Section 2) In the arguments which follow I will discuss how the representational system of the art gallery may be identified in terms specific to Dynamical Systems Theory; that is as a *Complex* system which therefore displays the behavioural properties of complexity. This is demonstrated through identification of two types of behaviour specific to *Complex Systems.* These are:

1 - Irreversibility and Positive Feedback; or 'Lock-in'

2 – Distributed Representation

The Drewe Myatt case has been used to illustrate this two points in the following terms. The ambiguity of the ontology of the 'genuine fakes' highlights the following:

1 - The distributed nature of the representations of the art world and in particular the gallery system. That is that the representation of the 'genuine fakes' as genuine is distributed over the gallery system rather than being specifically related to the material existence of the work of art itself.

2 – The role which irreversibility and positive feedback play in the gallery system plays is highlighted. This is because once an artwork has been 'represented' as a genuine artwork then it is very difficult to prove

otherwise and to reverse to process; hence the missing 120 or so 'genuine fakes'.

2.1 - Saatchi and Lock-in

The systems of the artworld are, as I argue here, complex systems and thus display behaviour common to complex systems such as being auto-catalytic (that is self-perpetuating,). They do this by being financially and socially self-determining and self-justified. This is demonstrated below by looking at the activities of Charles Saatchi and his role within the contemporary British artworld system of galleries, dealerships and criticism.

Since Charles Saatchi established the Saatchi Gallery in 1985 as a showcase for his collection his activities the gallery has become a locus and focus of contemporary British Art within the artworld system. As a dealer and collector he has been identified as having considerable influence within the art market. As Dan Glaister, writing in *The Guardian*, has noted, one way of looking at Charles Saatchi's influence is as:

> The driving force behind the rebirth of British art, the patron who has provided the locus and the critical mass to turn a disparate group of artists into a movement.[387]

By means of an example on the 8th of December 1998 Saatchi held a sale of a small part of his collection (between 4 and 5 percent). The 130 works by 97 artists secured £1.6 million, with 109 works being sold. The sale created an enormous amount of publicity and speculation in the press over Saatchi's influence within the Artworld.

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[387] Dan Glaister, 'Saviour or Destroyer? Maybe Both', *The Guardian*, (Wednesday, Oct. 21, 1998), pg. 5

One of the purposes of the sale was to raise money to fund the establishment of bursaries to finance the production of future young, contemporary art[388]; and it has been suggested that it provided a means for Saatchi to use his influence as a dealer and collector to cherry-pick the work of new artists at source which were attractive, collectable works with a high resale potential. As Patricia Bickers noted, in *Art Monthly*, this enabled Saatchi to have:

> The pick of the work of the new London graduates of the future. In this way, Saatchi could be said to have taken control of both the means of production and distribution, which should not surprise us about a collector who has been described... as the Rupert Murdoch of the artworld.[389]

The sale also demonstrated that this was a system which was autocatalytic and self-perpetuating in so far as it could fund itself. By buying art cheap, in bulk, and selling it on for profit Saatchi could use the money to buy future art whilst keeping the size of his collection in check. Saatchi himself noted a desire to make this system self-sufficient and he remarked that: "the collection has to be self-financing. Otherwise it would be a bottomless pit."[390] (And it will be observed below, that this system is also self-sufficient in the way in which it provides the conditions for its own critical and social legitimacy .)

At the time of the Christie's sale the system of the art market was in a particular situation defined by the two characteristics given below.

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388 £10,000 a year was offered to Chelsea, Goldsmiths', the Royal College and Slade art schools in London; secondly the Young Artists' Sponsorships Bursaries was established to provide support for artistic projects.
389 Bickers, 'Editorial', *Art Monthly*, 222, (Dec.1998-Jan.1999), pg. 18
390 Alberge, 'A Very Private Collector: Charles Saatchi, Britain's Leading Modern Art Collector Talks (but only a little) to Dalya Alberge', *The Independent*, (March 3rd, 1992), pg. 19

Firstly the art market boom of the 1980's was still a recent memory. During this time, aided by the voraciously free-market environment of Thatcherism, Saatchi's personal stock as both an advertising guru (as the joint chairman of Saatchi and Saatchi) and a speculator on the art market had risen astronomically.

Secondly, despite a recession[391] the art market continued to perform consistently well as Andrew Marr explained:

> During the last recession, art auction houses enjoyed a two year commercial boom. At the top end of the market, only a couple of weeks after Black Monday with stock markets plunging Van Gogh's Portrait of Dr Gachet was sold by Christie's in New York for $82.5m.[392]

A major reason for this, as Marr explained, is that art was seen by speculators to be a less risky investment option than stocks and shares:

> While I was [at a sale by Jeffrey Archer of 111 works by Warhol and 71 by Hockney at the Peter Gwyther Gallery, off Bond Street in October 1998] a buyer phoned in to say he was taking £50, 000 out of shares: he'd rather have paintings. At [another sale of contemporary art at] Sotheby's the place is thronging with South Americans, Italians and Japanese who also feel that, for the time being, art is safer than equities... So art-works become units of value like coffee options.[393]

This has a significance from a systems-theoretical perspective because, as outlined in W. Brian Arthur's example of the video-recorder market of the 1980's, economies can be seen to behave like complex systems. This means

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391 There was a world-wide recession following 'Black Monday' the notorious day on October 19, 1987 in which the Dow Jones Index fell by 508 points, almost 22% and which is identified as the largest one-day drop in the history of the New York Stock Exchange.

392 Andrew Marr, 'Throwing the Baby Out With the Bath Water?' *The Guardian Saturday Review,* (Sat. Oct. 24th, 1998), pg. 3

393 See Andrew Marr, 'Throwing the Baby Out With the Bath Water?' *The Guardian Saturday Review,* (Sat. Oct. 24th, 1998), pg. 3

that apart from Saatchi's influence the current art market adheres to certain examples of positive feedback as Marr has observed:

> There is a network of accepted values and conventions underpinning a painting or print as a tradeable commodity. For a painting, that includes the artist's status in a league table (Picasso equals the US; Pissarro, Germany; and Marquet, Argentina); the quantity of his work in circulation (art monetarism), the existence of similar works in public collections (the national reserve banks.)[394]

Saatchi clearly has significant influence within the markets of the art world. As Gordon Burn has observed with regards to Saatchi's influence:

> Saatchi's nose for the coming young art star, the next new thing, is legendary by now. He has an unrivalled track record. For a decade his purchasing decisions have influenced collectors of vanguard art all over Europe and America. Being taken up by Saatchi has become one of the conditions of success for any young artist.[395]

A further example of Saatchi's influence is demonstrated by the exhibition *Sensation: Young British Artists from the Saatchi Collection* (1997) which was held at the Royal Academy of Arts in London. With over 300,000 visitors *Sensation* was the most popular RA show of contemporary art in living memory[396] and it greatly increased the public profile and popular awareness of Saatchi's collection and his activities as a dealer and collector.

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394 Andrew Marr, 'Throwing the Baby Out With the Bath Water?' *The Guardian Saturday Review,* (Sat. Oct. 24th, 1998), pg. 3

395 Gordon Burn, 'I Want It, I Want It All, and I Want It Now,' *The Guardian G2,* (Monday, Dec. 7th, 1998), pg. 1-2

396 Sensation was 'the Royal Academy's most popular show since a summer exhibition in the dying days of Queen Victoria.' Andrew Marr, 'Throwing the Baby Out With the Bath Water?' *The Guardian Saturday Review,* (Sat. Oct. 24th, 1998), pg. 3

Commentators have complained[397] that *Sensation* provided a lop-sided view of the state of British art being based, as it was, on the concerns (financial and aesthetic), taste and whims of just one collector and dealer. From a systems perspective it could be argued that *Sensation* provided an example of a cultural system becoming 'locked-in' around particular pattern of cultural activity and particular objects. In this case it could be argued that the 'attractor' around which the system had become locked was Saatchi himself.

And as Stallabrass has observed this influence and 'lock-in' can also lead to a conflation between perceptions of economic and aesthetic value:

> Art objects are near-perfect commodities: lacking the complications of usefulness, they are pure tokens of exchange, their value based on opinion alone. Yet the power of their exchange value is taken for an aesthetic charge... Money is the necessary and often the sole raison d'être of the gallery system; yet, at least in terms of the presentation, the galleries have a prissiness about it, carrying the conventions of mercantile display to such a rarefied level that the visible signs of commerce (price tags, special offers) tend to disappear. Money must simultaneously be gestured at and concealed, since it is both essential to aesthetic aura and what threatens to taint it.[398]

It is Stallabrass's conclusion that in what he refers to as the current *fine art system* there can be no distinction made between aesthetic and economic value; the expensive is regarded as the beautiful, and that deemed to be beautiful will certainly be expensive:

> In pursuing aesthetic value, we embark on the old quest for the ghost in the machine of the fine art system. As that system is currently set up, money is both the fuel of the machine and its output, aesthetic value its exhaust, constantly evaporating in the polluted atmosphere of mass culture, and as long as the machine

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[397] A thorough bibliography of the literature on Saatchi is provided by Stallabrass, Ibid.
[398] Stallbrass, *High Art Lite*, (Verso, 1999), pg. 80

> runs, constantly replaced. It is pointless to look for the ghost in the machine; look rather for the pecuniary machine in what appears to be the ghost.[399]

Given this conflation between the aesthetic and the economic those (such as Saatchi) who exert a significant economic influence within this system can therefore also be regarded as exerting a significant aesthetic influence within this system. In this respect the artworld system behaves like a complex system by demonstrating the effects of positive feedback. It is further noted that given Saatchi's role as a cultural attractor within the gallery systems within which he operates his influence should be seen as not only unsurprising but actually as inevitable consequence of complex behaviour within the art world systems as they become 'locked-in' around particular cultural tropes.

Stallbrass rejects the gallery as the sole provider of art status to objects as too simplistic and also emphasises the role which art schools play in the establishment and definition of Art. He argued that:

> By far the most successful definition - though still imperfect - is to say that art is something done by those who went to art school. The closed shop operates with remarkable effectiveness, and you will find very, very few artists endorsed by the gallery system, private or public, who have not been through an accredited course. The art schools are at the opposite end of the process to the public galleries but both have the same role, that of sanctioning a particular set of objects or practices as art.[400]

This provides a further example of the artworld system locking-in around a particular pattern of behaviour and producing a particular output. In the case of the work of the YBAs supported by Saatchi the role of art schools, particularly Goldsmiths, provides us with clear examples of positive

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399 Stallbrass, *High Art Lite*, (Verso, 1999), pg. 83
400 Stallbrass, *High Art Lite*, (Verso, 1999), pg. 180

feedback. In this case the art market became locked-in around particular style or ethos which even though diverse and hard to define exactly could be broadly defined in terms of Saatchi's patronage. This is the style which Stallabrass has dubbed 'High Art Lite.'

3 – Five Implications of the application of Dynamical Systems Theory to an analysis of the cultural systems of art.

Complex systems have a memory which is expressed in terms of their irreversibility and this was outlined in the example given in the introduction to section 2 the manner in which the market 'remembered' initial effects causing it to 'prefer' VHS over Betamax, Complex systems reach *Bifurcation Points* or points of no-return beyond which when passed the system cannot be reversed to a previous state. Because of the irreversibility of a system's memory it 'remembers' previous states and incorporates these into its current state. In turn this means that effects cannot be reversed, small causes can be amplified to have big effects; often with surprising and unexpected results such as the dominance VHS. This demonstrates how a system's memory can lead to the effects of *Positive Feedback* or what has also been called the *Butterfly Effect.* W. Brian Arthur calls the effects of positive feedback examples of systems *Locking-In* around a certain behavioural pattern. And, as has already been noted elsewhere in the thesis systems such as ant colonies or financial markets can become *Locked-In.*

It is argued, therefore, that the systems of art galleries and art markets can, like ant colonies and Video-recorder markets, also become *locked-in* around certain patterns systemic behaviour and attractors. And via the mechanisms of positive feedback cultural systems, just like other

systems, can become more and more firmly entrenched in representing particular values and interests and thus become *locked-in*. This leads me onto the concluding section of this chapter in which I outline five implications of the application of Dynamical Systems Theory to an analysis of the Art Gallery. They are presented below

3.1 - Isomorphisms

Saatchi is just one example of a *strange attractor* around which a complex cultural system has become locked via the processes of Positive Feedback. Von Bertalanffy identified a key aspect of his *General Systems Theory* as a similarity ('isomorphism') to be found between disparate systems. If the example of Saatchi's influence is a demonstration of the behaviour of one complex system then, given these suggested isomorphisms between systems then we should be able to find other examples of cultural locking-in in gallery systems. As the example of Saatchi demonstrated a gallery system can be seen to lock-in around the dominant personality of a key collector. The importance of key collectors has shaped the accepted histories of art as Gere and Vaizey observed:

> Collecting must, in our view, significantly alter the repute of the objects collected, not only by adding to knowledge and expanding appreciation, but perhaps even more by conferring status: the collector can make the unfashionable or ignored more central to the culture of the day.[401]

To demonstrate this a similar process of feedback and 'lock-in' can be seen in the significance of Peggy Guggenheim's collecting in the establishment of American Abstract Expressionism as a dominant cultural

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401 Gere & Vaizey, *Great Women Collectors*, (Harry N Abrams, 1999)

system. Like Saatchi she was a wealthy patron of contemporary art whose support, especially whilst she lived in New York and collected American Art, could transform the status, significance and value of an artist. This is demonstrable in the example of Pollock whose reputation was, arguably, created by the dual poles of influence of Peggy Guggenheim and Clement Greenberg. Tom Wolfe described this positive feedback loop of how an artist's reputation could snowball on receiving the correct patronage in the following terms:

> Greenberg didn't discover Pollock or even create his reputation, as was said so often later on. Damnable Uptown did that. *Pick Me!* Peggy Guggenheim picked Pollock. He was a nameless down-and-out boho Cubist. She was the niece of Solomon (Guggenheim Museum) Guggenheim and the centre of the most chic Uptown art circle in New York in the 1940s... In a single year, 1943, Peggy Guggenheim met Pollock through Baziotes and Motherwell, gave him a monthly stipend, got him moving in the direction of Surrealist "automatic writing" (she loved Surrealism), set him up on Fifty-seventh street - Uptown Street of Dreams! - with his first show - in the most chic Modernist salon in the history of New York, her own Art of This Century Gallery, with its marvellous Surrealist Room, where the pictures were mounted on baseball bats - got Sweeney to write the catalogue introduction, in prose that ranged from merely rosy to deep purple dreams - and Barr inducted one of the Paintings, *The She Wolf*, into the Museum of Modern Art's Permanent Collection - and Motherwell wrote a rave for Partisan Review - and Greenberg wrote a super-rave for *the Nation*... and, well, Greenberg was rather late in getting into the loop, if anything.[402]

3.2 - The effect of individual agency is minimised.

In identifying the artworld and the gallery as systems then they are identified as complex interconnection of component parts. As we saw in the example from the preceding chapter an ant colony might be seen to behave like such a complex system of many connected components. In the ant colony, as with other complex systems, the organic unity of the whole

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[402] Wolfe, *The Painted Word*, (Black Swan, 1989) Pg. 56

system is of greater operative significance than the individual components. Thus it is not that one smart ant in the maze finds the way to and from the food, similarly in the complex system of the brain one neuron doesn't think for itself but instead thought is distributed over the entire system. Likewise in W. Brian Arthur's example in order to explain the market shift to VHS we can't explain this through the actions of any singular agent, be this the VHS designers, their marketing department or a particular recorder dealership. Instead we can note that the system as a whole settled into a particular pattern. Similarly whilst it may be rhetorically convenient to lay the blame for the current state of contemporary British art solely upon the shoulders of one man this is as unsatisfactory as blaming an art for the behaviour of its colony, or blaming a neurone for an inappropriate thought. Within any complex system and hence also within the artworld the effect of individual agency is minimised. Hence we should look upon the phenomenon of Saatchi as distinct from Saatchi the individual. As a phenomena it is one which is relative to the systems within which emerges; in other words as an attractor rather than an agent; and an emergent phenomena rather than prime mover. And within such complex systems there will be other attractors and emergent phenomena. As an individual however we should see Saatchi the man and other figures and components like him, out of which the whole network is composed, as just singular elements which contribute to the functioning of the greater unity of the system. Just like an neurone. Or an Ant.

3.3 - Criticism becomes self-fulfilling

Every damning column inch, book or radio and television report which condemns Saatchi (as in Hatton & Walker's *Supercollector*[403]), his taste in British Art (Stallabrass[404]) and his influence contributes to a self-fulfilling cycle of positive feedback. Hence with every act of reflection the system becomes further *locked-in* around these examples. News breeds news. And the media phenomenon surrounding Saatchi features prominently in most of the commentaries upon him. This, in turn, creates more column inches and publicity which creates more of a story; and so on, and so forth.

The Royal Academy was complicit in the generation of positive feedback. It courted the press with information about the controversial works within the show such as the exhibition's show-stopper Marcus Harvey's, *Myra*, (1995) which received fierce criticism from the right-wing press over its portrayal of Myra Hindley painted using a cast of a child's hand; Chris Ofili's *The Holy Virgin Mary* (1996) also received strong criticism.[405] The Academy also publicly suggested that some of the artists within the show were to be offered RA membership.[406] This offer was a hollow and cynical gesture calculated to generate further publicity[407] because, as Stallabrass noted; firstly the number of Academy members is

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403 Hatton & Walker, *Supercollector*, (Ellipsis, 2000) which is a crude attempt to provide a self-styled "hostile critique written from a socialist perspective." pg. 10
404 see chapter 7, 'Saatchi and *Sensation*' in Stallabrass, *High Art Lite*, (Verso, 1999)
405 See 'Mother's Fury at Myra "Art"', *Daily Mail*, (July 26th, 1997); Armstrong & Byrne, 'Artless: Fury at Child-Fingerprint Portrait of Monster Myra', *Mirror*, (July 26th, 1997); Waugh, 'The Great Painting of Myra "Designed to Shock"', *Evening Standard*, (July 25th, 1997); Mouland, 'Invitation to Outrage', *Daily Mail*, (September 17th, 1997); 'Exhibited by the Royal Academy in the So-called Name of Art, Defaced by the People in the Name of Common Decency', *Mirror*, (Sept. 19th, 1997); 'How can this pile of Sh*t be worth £250,000?', *Sport*, (Sept. 19th, 1997); Johnson, 'An Obscene Picture and the Question: Will Decency or Decadence Triumph in British Life?', *Daily Mail*, Spet. 20th 1997. Stallbrass also provides a good overview of the outrage generated by *Sensation*, in 'Saatchi and Sensation', Ch. 7, *High Art Lite*, (Verso, 1999)
406 Stallbrass *High Art Lite*, (Verso, 1999) pg. 200-2
407 Although four members did resign over the exhibition.

fixed so that normally members will only be replaced on death. And secondly the offer was to provoke an inevitable yet unwitting complicity in the positive feedback loop of publicity from the artists themselves who immediately and predictably condemned the RA board (Hirst called them 'Fat, stuffy, pompous' and Jake Chapman branded them, 'whinging alcoholic old farts[s]'[408].

The self-perpetuating tension in the RA board was replicated by the oppositional opinions exhibited in the critical responses to the exhibition with a conflict between those seeking to condemn and the exhibition's apologists. However, the exhibition was not ignored, and both negative and positive responses served the same function of ever increasing interest with critics either endorsing the controversy or creating more of the activity they were seeking to oppose. As Stallabrass has noted the work actually requires opposition in order to create a significance for itself:

'*High Art Lite* has relied upon the outrage of such red-faced bored to make it seem young, cool and oppositional.'[409]

As Gordon Burn observed in *The Guardian, Sensation* earned a great deal of publicity for how much publicity it was gaining.[410] This is a technique with which Saatchi would have been familiar given his experience as an advertising executive and it has echoes of the advertising strategy of embedded marketing whereby a product is planted in the media in the trojan horse of another story[411] hence providing publicity without the need to rely upon the placing of expensive adverts. This use of publicity to

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408 Both references from Stallbrass *High Art Lite*, (Verso, 1999) pg. 202
409 Stallbrass *High Art Lite*, (Verso, 1999) pg. 209.
410 Gordon Burn, 'I Want It, I Want It All, and I Want It Now,' *The Guardian G2*, (Monday, Dec. 7th, 1998), pg. 1-2
411 Such as the example of a scientific study carried out on behalf of a product.

generate publicity is another form of positive feedback at work and in the case of *Sensation* the brand being promoted was Saatchi himself around which a cultural system was becoming *locked-in.* Thus commentaries, critical or otherwise, on Saatchi's activities merely perpetuate the increasing phase-lock within the system. In this respect there is a certain irony in observing that the more vociferous a critique the more it will become self-defeating by re-enforcing the cultural significance and postive feedback loops of significance and exclusion which they seek to criticise.

As physical objects books have a permanence and irreversibility within social, cultural and epistemological systems in so far as they both create and curate historical legacies for the material they contain. What is meant by this is that if a book about a particular subject is published and then bought by a library a certain *locked-In* permanence is granted the subject matter. This is due to the relative irreversibility and permanence of the physical object of the codex. If we take the example of Charles Saatchi and *High Art Lite*, when the current debates concerning the status and role of Saatchi in the contemporary art market have abated , then the book will remain on the shelf for future reference radiating a transfigurative and emergent historical significance onto its subject matter; hence there will be a 'lock-in' in the cultural system around this paradigm. Therefore art without a permanent textual record of its existence (other than itself) around which for the system to *lock-in* seems much more likely to fade from public and historical memory. In the case of British Art of the last twenty years it seems likely that this forgotten art, the locked out betamaxes of the cultural system will include much of the art ignored or dismissed by

Saatchi as being either a poor investment or simply not fashionable or 'cool' enough..

Contemporary Artists are well aware of the significance of Saatchi's influence. One of the reasons for this can be attributed to the media-savvy which is indoctrinated into them at art schools such as Goldsmith's where students are instructed into how to succeed in the contemporary market. Goldsmith's has produced many of the artists Saatchi has collected in bulk and at a speech made at the Turner Prize award ceremony in the Tate in 1994 Saatchi observed:

> Now I don't know, anymore than you, what has made our young artists suddenly so supercharged, but I am certain that teachers like Michael Craig Martin at Goldsmiths' College have had a tremendous effect. Now Goldsmiths', and in recent years the Royal College, and some other art schools, they have set a tone and a level of ambition that has stimulated not just their graduates, but young artists all over Britain who are producing work that is challenging, articulate and relevant.[412]

From this is not difficult to make the assumption that ambitious students, aware of the significance which Saatchi's influence holds, could be creating works in attempts to appeal to his taste. Chris Offili put it this way:

> A lot of artists are producing what is known as Saatchi art... You know it's Saatchi art because it's one off shockers. Something designed to attract his attention. And these artists are getting cynical. Some of them with works already in his collection produce half-hearted crap knowing he'll take it off their hands. And he does.[413]

Stallabrass has made the acute observation that if there is a style to the work of the YBAS it lies in their attempt to produce work that will appeal to the taste of a man whose background in advertising is manifested by a

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412 *Without Walls*, Channel 4 Television, (22nd Nov., 1994)
413 Quoted in Stallabrass, pg 200

taste which is: "is very much for art that looks like advertisements, and who - except an adman - would want to own one of them?"[414] Thus there is a lock-in around an art which is striking - in so far as it must have the initial impact of a billboard (such as the work of Hirst for example) and work produced in non-threatening and non-volatile media which must be portable, durable and hence sellable. This discreteness of media need not be the only concern, as was seen in the case of Hirst's *Away from the Flock,* (1994); a dead lamb supported in a case or Marc Quinn's *Self* (1991); a cast of the artist's head made from nine pints of the artist's frozen blood and a refrigeration unit which must be kept turned on at all times so as not to defrost. However in both cases the relative expense and volatility of the objects extenuated the predominant aspect of the work which provides a unifying aspect to most, if not all of his collection. This is that the work is object based art which provides a positive and easily readable advert for itself.

3.4 - Unpredictability

Whilst we may be able to determine patterns in the ways in which apparently chaotic and complex systems behave (such as Lorenz Attractors) they are defined as being unpredictable; we can't know in what direction they will develop. Thus, as W. Brian Arthur notes, despite there being good reasons to predict its success, in terms of a suggested technical superiority over VHS, the Betamax video format was eclipsed in its market. This is because due to the operation of positive feedback within complex systems what appear to be small causes may have very large effects; and we

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414 Stallabrass, *High Art Lite*, (Verso, 2000) pg. 201

can't know what these effects will be. This leads to two related observations.

Firstly that it may be seemingly insignificant reasons was to why one work of art gets sold over another. This contradicts any belief in any historical teleology within the development of art or that the history of art may be shaped by the desire and prerogative of forceful and dynamic individuals.

Secondly the issue of quality in art becomes more ambiguous. That VHS would triumph over Betamax was impossible to predict and the eventual outcome was not an index of the technical triumph of the VHS format. Likewise it might also be suggested that particular cultural forms (be these the work of an artist or a particular style etc.) do not succeed, in terms of their social and cultural dominance, because of any supremacy of their technical or aesthetic quality. The Art we have now is merely that which around which the cultural systems of its support has become *Locked-In.*

And this leads me on to the fifth, and final, conclusion of this 3rd chapter section on Saatchi.

3.5 - Betamax Art

As Peter Davis parodies in his work *Hot One Hundred* (1996) the canon of what is fashionable is an arbitrary list of the usual suspects which reflect whims of taste which may behave, like other systems, chaotically and complexly. The history of cultural criticism is composed of attempts to redress the balance of canons which have become 'locked-in' around particular cultural forms at the expense of the exclusion of other cultural forms. This suggests that there is a flipside to the Institutional Theory of

Davis: *The Hot One Hundred*, (1997)

Art. This complementary view argues that just as there may be a social ontology of art explicable through inclusion within the representative system of the Artworld, so too there may be art which has been rejected and excluded from this system (by virtue of not being observed by that system.) To stretch the video-recorder analogy further - if the YBA's and Saatchi-supported art is VHS, then there may also be Betamax art and artists.

It is difficult to find extensive examples of artistic activity which has been completely excluded from the artworld because it is, by this very exclusion difficult, if not by definition impossible, to find. The history of art is a patchwork whose very warp and weft is woven from the strands of that which it has excluded, ignored and rendered obsolete in one form or another. Various politically motivated attempts to redress this balance have formed the basis of many different strategies which have sought to reconfigure or critiques the values of the artworld on the basis of gender, class, race and sexuality. The art of the 'outsider' or 'other' is where we will find our Betamax artists.

One example of that which we might call a Betamax artist has been publicised by the artist in question himself who has complained vociferously and at length about his falling stock in both cultural and fiscal capital. The artist in question, Sandro Chia, could have been forgiven for thinking that he would corner a market share when, in 1985, Saatchi bought six of his works. He was, however sceptical of the attention it would bring and wrote in a letter to *Art News*:

> Mr Saatchi started to buy my paintings very early - so early that I think I was the first painter that was not American to be included in his collection. At the time of his acquisitions, I remember him

Chia: *Primavera*, (1998)

Betamax Art?

> telling me how highly important he considered my work, etc. Far from being impressed by his opinion, I rather expressed to my dealers my concern about any person accumulating my works in such number, thereby establishing a control and quasi-monopoly.[415]

When Saatchi subsequently sold all of works by Chia his work rapidly devalued as it became, effectively, excluded from the canon. At least this was the way in which Chia saw his status mutate from a VHS to a Betamax artist almost overnight. Writing about the effect of the removal of his work from Saatchi's holding Chia was to note at a later date in a statement that:

> At that moment I understood the power of the guy. I thought I might as well go and paint in Alaska. My telephone was ringing constantly and from that moment no one was ringing any more, it was unbelievable.[416]

4 - Lock-In as Cultural Inertia – A further discussion

In this concluding section I discuss further the systems-theoretical concept of 'lock-in' (or positive feedback and irreversibility) and how this is manifested in inertia of the cultural systems of the artworld.

4.1 - Building as system: Beaubourg and Baudrillard

The galleries and museums of the artworld are housed in buildings; and the architectural fabric of these buildings will also evolve and adapt like a complex physical system. In *How Buildings Learn* Stewart Brand describes how evolutionary architectural systems are at play in the buildings which surround us, and how these buildings not only *lock-in* to certain patterns but also form patterns which evolve over time. He says:

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[415] Chia, 'Saatchi's "Dispersals"', a letter to *Art News*, vol. 84, no. 7, (Sept. 1985), pg. 9.
[416] Chia, statement in 'Making Art, Making Money: 13 Artists Comment', *Art in America*, vol. 78, no. 7, (July 1990), pg. 138-9

> Between the dazzle of a new building and its eventual corpse, when it is either demolished or petrified for posterity as a museum, are the lost years - the unappreciated, undocumented, awkward-seeming time when it was alive to evolution. If [Brian] Eno is right [that buildings demonstrate an 'internal complexity that show the traces of an interesting evolution], those are the best years, the time when the building can engage us at our own level of complexity.[417]

Brand's argument is that buildings are systems which will change according to their needs and function regardless of the desires of the architect. For this reason he argues that more flexibility should be built into architectural systems from their genesis in order that buildings can improve over time rather than become dysfunctional and obsolete. If a building system cannot adapt well to the change it will experience over time, that is if it is too *locked-in* to allow for evolutionary growth, then it will fail; and this is usually manifested in the building being demolished. The alternative, Brand argues, is an architectural system which incorporates change over time, that is the building functions as an adaptive complex system, rather than an rigid, unchanging structure.

Brand notes:

> An adaptive building has to allow slippage between the differently-placed systems of *Site, Structure, Skin, services, Space Plan and Stuff.* Otherwise the slow systems block the flow of the quick ones, and the quick ones tear up the slow ones with their constant change... Age *plus adaptivity* is what makes a building come to be loved. the building learns from its occupants, and they learn from it.'[418]

With its network of exposed services and complex system of pipes, nuts bolts and scaffolding The Pompidou Center at Beaubourg in Paris ,known

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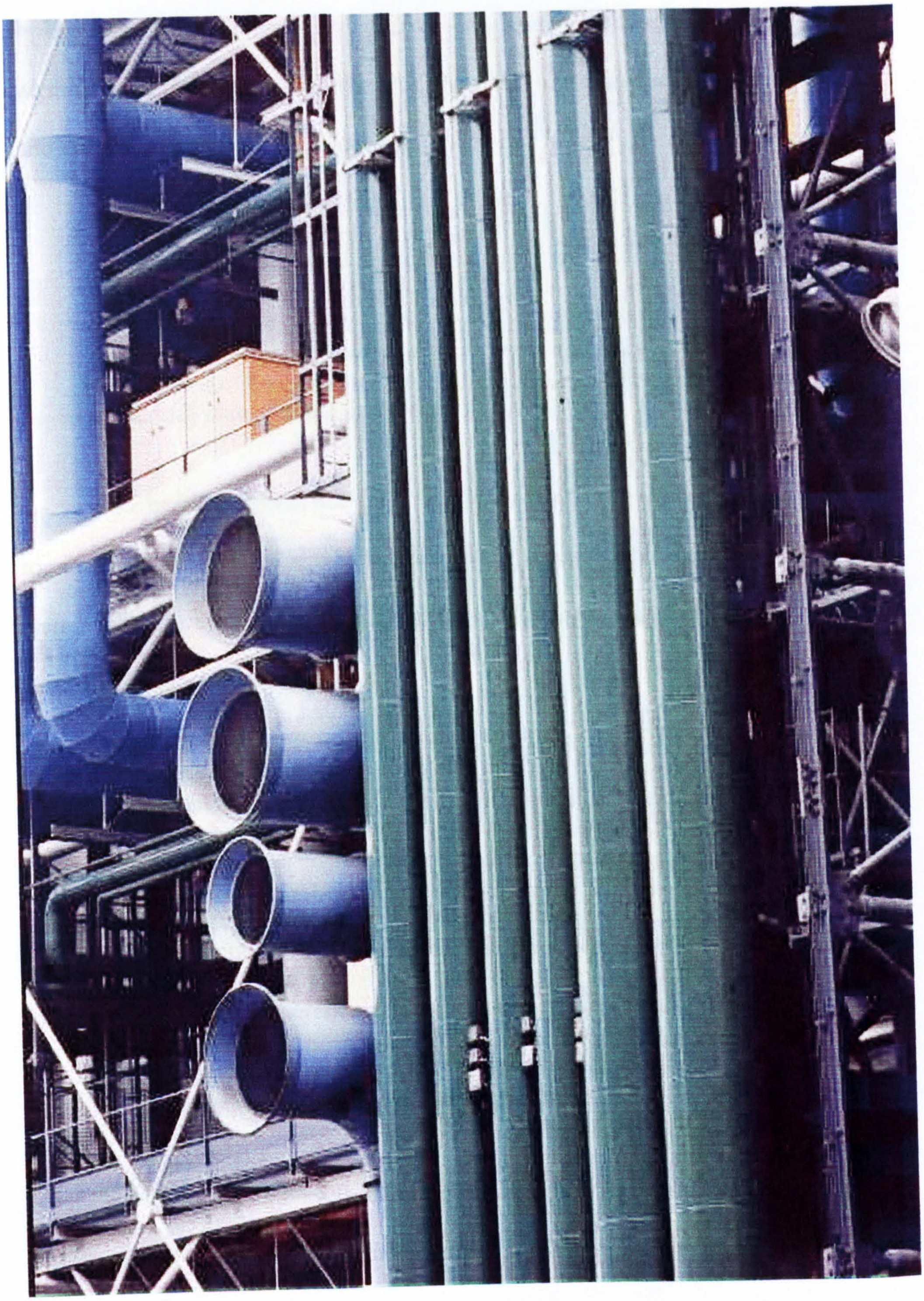
[417] Brand, *How Buildings Learn: What Happens After They're Built,* (Phoenix Illustrated, 1997) pg. 11. The Brian Eno quote is taken from Brand's preceding text and is not attributed.
[418] Brand, *How Buildings Learn: What Happens After They're Built,* (Phoenix Illustrated, 1997) pg. 20, 23



The building system at the *Centre Pompidou*

by locals as *The Pompidolium*[419], is a gallery which exemplifies Brand's arguments by actually looking like a system. It has, for example, multiple and complex, functions as Nathalie Heinich has documented:

> It is complex in a literal sense in that the building contains several distinct departments, such as the Public Information Library (BPI), the National Museum of Modern Art (MNAM), and the Center for Industrial Creation (CCI), as well as being the home of an number of other activities (children's studio, cinémathèque, meetings/ forums, audio-visual unit, publications and periodicals) and having the institute for Acoustic and Musical Research and Creation (IRCAM) close at hand in the *Place Stravinsky.*[420]

The building system not only looks like a machine it works like one too illustrating the functioning of the gallery as a processing system. It is a system which processes people and culture in an efficient manner, perhaps too efficient as has been observed:

> Forecasts based on studies carried out in the early 1970's suggested that there would be between 8,500 and 15,000 visits per day, making an annual total of between 2.5 and 4.5 million. In reality, the figure has been much higher, the daily average being some 25,000 visitors, giving an annual total of 7.3 million visits.[421]

Since it opened in 1977, 145 million visitors have come to ride the external escalators with their cinematic views of central Paris, and to see great exhibitions of Dali, Matisse and Derain. That's an average of 23, 000 a day, and all this for a cultural center designed for an optimistic capacity of 5,000 a day. No wonder the Pompidou was looking shabby and threadbare by the mid-90's[422]

Like other museums, galleries and exhibition spaces *Centre Pompidou* is a factory for culture; an industrial system, and a cultural system which

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419 "Not for nothing does local humor call it the Pompidolium – it does in fact look like an oil refinery." In Banham, 'Enigma of the Rue du Renard', *Architectural Review*, (1977)
420 Heinich, 'The Pompidou Centre and its public: the limits of a utopian site,' in - *The Museum Time Machine*, ed. Lumley, (Routledge, 1988)
421 Heinich, 'The Pompidou Centre and its public: the limits of a utopian site,' in - *The Museum Time Machine*, ed. Lumley, (Routledge, 1988)
422 Jonathan Glancey, *The Guardian*, (Wednesday, Jan. 19th, 2000)

exposes its own supporting structure literally and suggestively - if you know where to look. It is a system with a production line which processes people and generates the appearance [simulacra] of culture, as Baudrillard observed in his extended discussion on Beaubourg;

> Frankly the only contents of Beaubourg are the masses themselves, which the building treats like a convertor, a black box, or in terms of input/ output, just like a refinery handling petroleum products or a flow of raw material. Never has it been so clear that the contents – here culture, elsewhere information or merchandise – are merely the ghostly support for the opposition of the medium whose function is still that of beguiling the masses, of producing a homogenous flow of men and minds.[423]

Yet for Baudrillard it is precisely this [dys]-functional efficiency of the institution which provides its potential and its salvation. And this occurs through the institution's paradoxical role in an apparent implosion and negation of cultural activity. In 1977 Baudrillard gleefully (and apparently correctly) predicted *The Pompidou Centre's* future problems:

> Critical Mass. Implosive Mass. Above 30,000 it threatens to "Buckle" Beabourg's structure. That this mass, magnetized by the structure, should become a factor of potential destruction for that very structure... what if this were intended by those who conceived the project (but it is beyond one's hopes)... if it were part of something they had programmed, the chance to finish off both architecture and culture in one blow... well, Beaubourg would then be the most audacious object and successful happening of the century.
> MAKE BEAUBOURG BUCKLE! A new revolutionary slogan. No need to torch it or to fight it; just go there! That's the best way to destroy it. Beaubourg's success is no mystery; people go there just for that. The fragility of the edifice exudes catastrophe, and they stampede it just to make it buckle.[424]

Thus it may be possible to regard *Beaubourg* as a large Lorenz attractor around which a complex network of dynamic urban, cultural, political,

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[423] Baudrillard, 'The Beaubourg-Effect: Implosion and Deterrence,' [trans. Krauss, Michelson,] *October* 18, (1981)
[424] ibid

social, financial, theoretical matrices are drawn. Here one can see the resonance between W. Brian Arthur's observations that positive feedback plays a role in the dynamics of such complex, open systems and Baudrillard's commentary on *Beaubourg*;

> Thus this concave mirror: it's because they see the mass(es) inside it that the masses will be tempted to crowd in. It's a typical marketing device from which the whole ideology of transparency draws meaning. Or put another way, in presenting an idealized miniature model they hope to produce an accelerated gravitational pull, an automatic agglutination of culture as an automatic agglomeration of the masses. The process is the same: the nuclear chain reaction, or, the spectacular operation of white magic.[425]

Read in such a way the cultural centre, like the museum, becomes a strange social attractor which 'locks-in' culture around itself simulating that which looks and acts like culture but which for Baudrillard negates art and leads to the death of actual or real cultural activity:

> Thus everything is neutralized at the same time: Tinguely is embalmed in the museological institution and Beaubourg is trapped within its so called artistic contents.[426]

Central to Baudrillard's argument in the *Beaubourg* paper is the paradox that the cultural centre of *Centre Pompidou* negates culture by both absorbing and neutralising the creative and psychic potential of cultural activity. And this occurs due to the functioning of the system as a means by which particular social, cultural and political relationships are represented. *Beaubourg* is therefore, for Baudrillard, symptomatic of the hyper-reality of late 20th century life in which reality is masked and perverted by the semiological logic of what he refers to (throughout his work) as 'the third

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[425] Baudrillard, 'The Beaubourg-Effect: Implosion and Deterrence,' [trans. Krauss, Michelson,] *October* 18, (1981)
[426] ibid.

order of simulation,' which is characteristic of late capitalism. In this third order, Debord's 'Society of the Spectacle'[427] has mutated into the spectacle which simulates and replaces society - we no longer have access to a basic reality but only consume a simulation of it.

This argument was first developed by Baudrillard in T*he System of Objects*, in which he argued that the function and utility values of objects such as furniture are rhetorical values generated by this system of objects and the dynamics of its internal system of signification. As such the system generates and conveniently pre-packages for mass consumption the iconography of use value which is attached to objects.

> Every object claims to be functional, just as every regime claims to be democratic. The term evokes all the virtues of modernity, yet it is perfectly ambiguous. With its reference to "function" it suggests that the object fulfills itself in the precision of its relationship to the real world and to human needs. But as our analysis has shown, "functional" in no way qualifies what is adapted to a goal, merely what is adapted to an order or system; functionality is the ability to become integrated into an overall scheme. An object's functionality is the very thing that enables it to transcend its main "function" in the direction of a secondary one, to play a part, to become a combining element, an adjustable item, within a universal system of signs...
> The functional system is thus characterized, in a thoroughly ambiguous way, on the one hand by a transcendence of the traditional system under its three aspects - as the primary function of the object, as drives and primary needs, and as a set of symbolic relations between the two - and on the other hand by a simultaneous disavowal of these three mutually reinforcing aspects of the traditional system.[428]

As a development of this Baudrillard argues that at *Beaubourg* what is consumed is not culture, but rather that which is represented - through the functioning on the micro and local level of the Beaubourg system and

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427 Debord, *The Society of the Spectacle*, (Rebell Press, Aim Publications, 1987)
428 Baudrillard, *The System of Objects* [trans. Benedict,] (Verso, 1996) - first published as *Le Système des Objets*, (Editions Gallimard, 1968)

at the macro level of social relations in the hyper-real 'Third Order of Simulation' as a *simulation* of culture. Thus, like the iconography of utility value, at *Beaubourg* all that can be accessed is the iconography of aesthetics which has been hijacked - and with this hijack comes cultural implosion which removes the potential for genuine cultural activity which might serve as an antidote or site of resistance to the simulacral world we circulate within and around.

4.2 - Archive as System

As the Drewe and Myatt fraud illustrates the art gallery is not only defined by the system of its architectural fabric but is also constructed around a system of classification and cataloguing. Hence it is that the system of the archive might behave like other complex systems and demonstrate complex behaviour such as - *locking in*, *memory* (an archive is, after all, a system of memory), *irreversibility* and be *autocatalytic* (that is self-perpetuating.)

And the case is used here to demonstrate how the art gallery is a system of representation in so far as they observe, order, classify, differentiate and represent. This is demonstrated by the following example. At the centre of a rather obscure report on the 'International Symposium on the Conservation of Contemporary Art'[429] the following words on the classification system of the museum are given with reference to a proposed Tate Gallery Installation File System (for 'Installation Art') In their

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[429] *International Symposium on the Conservation of Contemporary Art, 7-12 July 1980, Abstracts*, (National Museums of Canada, 1980)

absurdity they read like they read like the scheme of a curator dreamt up by Borges:

> The file card design - The final layout and headings, have not, at the time of writing, been settled. The set of headings below summarises the kind of information that will be included. At some future date, it is hoped that the data will be computer-stored and storable in order to produce useful lists such as "All works needing electric power"; "All works with purpose-built storage facilities"; "All paintings not requiring barriers."[430]

Thus it is that if this system of archiving, differentiation and memory within the social system can be seen to be a system which is irreversible and which has become 'locked-in' then we could argue that the space of the gallery is the site of cultural inertia. It is the site, or attractor, around which the social system gravitates; and in doing so a particular configuration of social and cultural relationships also become 'locked-in'. Like Baudrillard, Robert Smithson too acknowledged the cultural inertia of the gallery, which has been identified as *locking-in*:

> Museums are tombs, and it looks like everything is turning into a museum. Painting, sculpture and architecture are finished, but the art habit continues. Art settles into a stupendous inertia. Silence supplies the dominant chord. Bright colours conceal the abyss that holds the museum together. Every sold is a bit of clogged air or space. Things flatten or fade. The museum spreads its surfaces everywhere, and becomes an untitled collection of generalisations that immobilise the eye.[431]

4.3 – Lock-In and Class

It has been suggested so far that the concept of the complex system can be applied to the systems of the artworld with specific reference made to the

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[430] Peter Wilson, Sandy Nairne, "The Installation File - Conserving by Documenting," in *International Symposium on the Conservation of Contemporary Art, 7-12 July 1980, Abstracts*, (National Museums of Canada, 1980) pg. 16-19

[431] Robert Smithson, 'Some Void Thoughts on Museums', 1967, in Smithson Ed. Flam, *Robert Smithson: The Collected Writings*, (University of California Press, 1996), pg. 42

art gallery/museum. This is in so far as there are observable patterns of 'lock-in' in both the archive system of the museum and the architectural system of the museum.

In conclusion a particular aspect of 'lock-in' within systems will be further extrapolated upon with a view to carrying it forward into the next, closing chapter. This is a theme which has already been mentioned in relation to lock-in and the effects of positive feedback. This theme suggests that cultural systems (like other complex systems) whilst being complex and unpredictable are also predisposed to inertia in so far as they lead to a certain stability being achieved within those systems. In Arthur's VHS/Betamax system a stability could be observed to emerge within the market. And in cultural systems this could be likened to the emergence of dominant cultural forms. An example of this inertia within a cultural system might be evidenced by the suggestion that YBA's were VHS art which cornered a market share over what I called 'betamax art'. It is thus suggested that this systemic stability is manifested as a form of cultural inertia which, in turn, has implications within the larger social systems with which it interacts.

Bourdieu has written extensively about the role the gallery system plays in the re-enforcement of the social hierachy of class structure. And while his approach can be critiqued as relying too heavily upon a particular conception of class distinction the central theme - that museum systems are a mechanism of cultural inertia or 'lock-in'- is one which I suggest can be recast in the vocabulary of a systems-approach.

In *Love of Art* Bourdieu attempted a thorough analysis of the public which visit European museums in order to:

> Devise a systematic survey of the European museum-going public, its social and educational characteristics, its attitudes to museums and its artistic preferences, as a *process of verification* aimed at confronting a coherent system of theoretical propositions with a coherent system of facts produced by - and not for - the hyposthesis which it was necessary to validate.[432]

Bourdieu uses the questionable criteria of 'quality' of a work of art on display in museums which he grades on a scale from one to five and which has been assessed and "evaluated by the panel of experts"[433] which he has used to establish a hierarchy of art works as displayed in European galleries. Despite the problems inherent in such a method which must rely upon the establishment of the quality of the artwork the hierarchy which is established can be seen to reflect a 'lock-in' in so far as that work which is perceived to be of a higher quality will attract more attention and visitors to the museum. As Bourdieu notes:

> Analysis showed that the majority of the museums' characteristics were strongly interrelated: disregarding the museums that receive less than 2,000 visitors a year (six museums, which are hard to reach and exhibit a small number of poorly presented works), it is apparent that the number of works displayed is strongly related to the number of visits (except in the case of certain large museums showing relatively few works but which are very famous or of great quality). The same applies to the fame and quality of the works (evaluated by the panel of specialists), which tends to demonstrate that, as far as visiting rates are concerned, the "official" hierarchy defined by the "cultural authorities."[434]

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[432] Bourdieu, Darbel, Schnapper, *The Love of Art: European Art Museums and Their Public*, trans. Beattie & Merriman, (Polity Press, 1991),pg. 5

[433] These experts were constituted by, 'a panel composed of five curators and art specialists selected from amongst all French museums, 123 art museums (containing paintings and sculptures.)' Bourdieu, Darbel, Schnapper, *The Love of Art: European Art Museums and Their Public*, trans. Beattie & Merriman, (Polity Press, 1991), pg. 6.

[434] Bourdieu, Darbel, Schnapper, *The Love of Art: European Art Museums and Their Public*, trans. Beattie & Merriman, (Polity Press, 1991), pg. 8.

This provides another example of positive feedback loops within cultural systems with the system gravitating around particular cultural forms. When the artwork is deemed to be of high quality, by the 'official hierarchy' it attracts visitors which, in turn as popular work attracts more visitors, attract more visitors; and so on. This leads to the lock-in of cultural inertia in so far as it leads to a dominance of the cultural forms which are identified and thus sanctioned by the 'official hierarchy' of the 'cultural authorities' and which subsequently cause people to be attracted to them.

When combined with a sociological critique of the function of museums based upon his own agenda of class distinction and analysis it is concluded that just as there is a 'lock-in' around certain museums so too there is a lock-in around the type of visitor to these museums:

> Museum visiting increases very strongly with increasing level of education and is almost exclusively the domain of the cultivated classes. The proportion of the different socio-economic categories in the French museum public is almost exactly the inverse of the proportion in the total population.[435]

Given that for Bourdieu increasing level of education is an index of class (in terms of 'socio-economic category') the art museum is 'locked-in' around the structural social order of bourgeois power relations and is both a function and instrument of such hierarchy. This is reflected in the education and the employment of visitors as Bourdieu notes:

> As the modal visitor to French museums holds a *baccalauréate* (55 per cent having at least this qualification), it is not surprising that the profile of the public, according to socio-economic category, should be very close to the profile of the population of French university students according to their social origin; the proportion

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[435] Bourdieu, Darbel, Schnapper, *The Love of Art: European Art Museums and Their Public*, trans. Beattie & Merriman, (Polity Press, 1991), pg. 14.

> of farmers and farm labourers in the public of French art museums is 1 per cent; that of industrial manual workers 4 per cent; craftworkers and tradespeople 5 per cent; clerical staff and junior executives 23 per cent (of whom 5 per cent are primary school teachers), and uppers classes 45 per cent.[436]

It is also noted that the time spent in the museum is a further index of both class and education:

> Thus the average time actually spent on a visit which can be taken to be an objective value given to the works on display, whatever the corresponding subjective experience might be (aesthetic pleasure, cultural goodwill, sense of duty or a mixture of all of these) increases in proportion to the amount of education received, from 22 minutes for working class visitors, to 35 minutes for middle class visitors and 47 minutes for upper class visitors.[437]

Education is an important indicator within Bourdieu's method of analysis because, he argues, it provides the means for one to decode the art on display and to therefore understand the systems of representation on display. It is thus the way in which certain social and cultural values and cultural forms perpetuate - in the preservation and transfer of cultural capital. From the systems-theoretical perspective this transfer of 'cultural capital' is observed as a form of memory (irreversibility) within a social system; and that this irreversibility provides the means by which the social system might become 'locked-in' around a certain social order. As Bourdieu (et al) note both the quality and the legibility of a work of art is mediated by the values of the social system, and is hence both relative to that system and maintained by the memory of that system through, amongst other apparatuses, the gallery system and the system of education:

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436 Bourdieu, Darbel, Schnapper, *The Love of Art: European Art Museums and Their Public*, trans. Beattie & Merriman, (Polity Press, 1991), pg. 15.
437 Bourdieu, Darbel, Schnapper, *The Love of Art: European Art Museums and Their Public*, trans. Beattie & Merriman, (Polity Press, 1991), pg. 38

Considered as symbolic goods, works of art only exist for those who have the means of appropriating them, that is, of deciphering them. An agents degree of artistic competence is measured by the degree to which he or she can master all the means of appropriation of works of art available at a given time: in other words, the interpretative schemata which are the condition of appropriation of artistic capital, that is, the condition of deciphering the works of art supplied to a given society at a given time.[438]

> The legibility of a work of art for a particular individual is a function of the distance between the more or less complex and sophisticated code demanded by the work, and the individual's competence, defined by the degree to which the social code, itself more or less complex and sophisticated.[439]

In Conclusion

This conclusion comes as a rejoinder to the predominant theme of the chapter. It has, thus far, been suggested that whilst the museum system is complex an implication of this complexity might be that this system acts as an apparatus of cultural inertia within social systems. That is that the complexity of the museum system allows for, by the processes of irreversibility and the memory of the system which is manifested in the effects of positive feedback, for the preservation of particular cultural forms. And with the preservation of certain cultural forms at the expense of the exclusion of others certain social hierarchies, structures and power relations are also maintained. It would seem then that there might be the tendency to lay the blame for a particular configuration of social power relations upon 'the system'.

In response to this blaming of the system it is suggested that 'lock-in' within cultural systems rather than being seen as a purely negative

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[438] Bourdieu, Darbel, Schnapper, *The Love of Art: European Art Museums and Their Public*, trans. Beattie & Merriman, (Polity Press, 1991), pg. 39
[439]Bourdieu, Darbel, Schnapper, *The Love of Art: European Art Museums and Their Public*, trans. Beattie & Merriman, (Polity Press, 1991), pg.42-3

phenomena which stifles all activity which it fails to validate by inclusion can also provide the conditions and potentialities for its own critique.

Robert Smithson recognised the potential for transgression and critique which the museum system provided:

> Well it seems to me that there is an attitude that tends toward McLuhanism, and this attitude would tend to see the museum as a null structure. But I think the nullity implied in the museum is actually one of its major assets, and this should be realised and accentuated.[440]

In this respect Smithson's identification of the potential site of cultural transgression as the site of potential cultural subjugation can be likened to the Foucauldian invocation of 'power' as transformative as opposed to purely repressive. As Foucault argued:

> Where there is power, there is resistance, an yet, or rather consequently, this resistance is never in a position of exteriority in relation to power... [The existence of power relations] depends upon a multiplicity of points of resistance: these play the role of adversary, target, support, or handle in power relations. These points of resistance are present everywhere in the power network. Hence there is no single locus of great Refusal, no soul of revolt, source of all rebellions, or pure law of the revolutionary. Instead there is a plurality of resistances, each of them a special case: resistances that are possible, necessary, improbable; others that are spontaneous, savage, solitary, concerted, rampant, violent; still others that are quick to compromise, interested or sacrificial; by definition they can only exist in the strategic field of power relations.[441]

And hence it could be argued that rather than acting as a site in which the propagation of cultural activity is negated, as Baudrillard pessimistically feared, the cultural inertia of the museum system actually provides for the possibility of resistance, action and transgression. It is this potential for

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440 'What is a Museum? A Dialogue between Allan Kaprow and Robert Smithson,' (1967), in Flam ed., *Robert Smithson: The Collected Writings*, (University of California Press, 1996), pg. 43-4

441 Foucault, *The History of Sexuality; Vol. 1, an Introduction*, trans. Hurley, (Penguin Books, 1998)pg. 95-6

resistance to the power relations implicit in the systems of the gallery, art history and other cultural systems which is where the artistic impulse which has been called The Institutional Critique emerges. This is the artistic impulse which Robert Smithson identified, with foresight which was proved to be well-placed, as:

> The great issue, I think it will be the growing issue, of the seventies; the investigation of the apparatus the artist is threaded through.[442]

Craig Owens has further discussed Smithson's comments in his discussion of such an impulse - 'From Work to Frame, or Is There Life After "The Death of the Author"?' (based around the activities of such postmodern artists as Marcel Broodthaers, Daniel Buren, Michael Asher, Hans Haacke, Louise Lawler, Martha Rosler, Mary Kelly, Allan Sekula, Robert Smithson et al.). Owens, like Smithson argues that it is imperative we engage with the:

> De facto social nature of artistic activity [in order that]... we ourselves are to employ rather than simply being employed by, the apparatus we all - "lookers, buyers, dealers, makers" - are threaded through.[443]

And this means looking to the systems around which art circulates.

Finally; this again raises the possibility of hanging a potentially huge ontological question mark over that which is not validated by being brought within the field of cultural production and which doesn't make it into the cannon. We thus return to the question that if practice and objects don't become institutionalised not only in galleries but also in art history then can they be called art - and if so on what terms?

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442 'Conversation with Robert Smithson; Edited by Bruce Kurtz', in Flam ed., *Robert Smithson: The Collected Writings*, (University of California Press, 1996), pg. 262-3

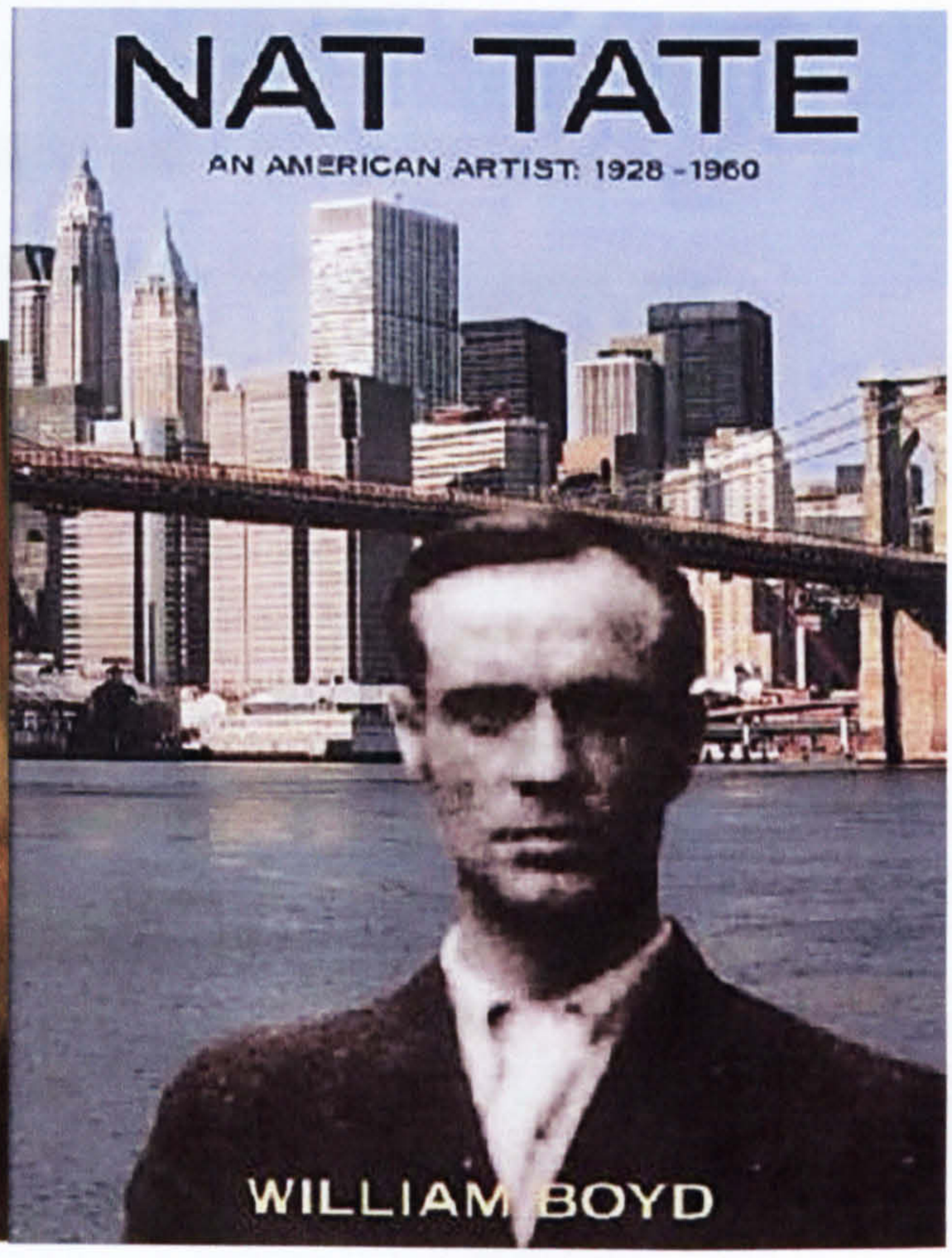
443 Owens, *Beyond Recognition*, (University of California Press, 1992) pg. 136

It is suggested therefore that discursive systems of art history, like galleries systems, are also locations around which 'lock-in' occurs. It is for this reason that we all, as art historians, should all be aware that the processes and systems which are engaged in, in terms of every thing that we write, and every thing we say are couched in terms of certain ideological positionings; which whilst seeming to be small causes might have large effects.

For we operate within a number of complex systems which have an irreversible memory. And which, despite our apparent lack of individual agency, we must take a collective responsibility for.

CHAPTER 7:

ART HISTORY IS A DISTRIBUTED SYSTEM OF REPRESENTATION OR ART DISCOURSE OBSERVED FROM THE PERSPECTIVE OF DYNAMICAL SYSTEMS THEORY



(Clockwise from top left)
Rembrandt, *Self Portrait*, (1661),
Cover of *Nat Tate*, by Willliam Boyd
Stella at work, (on an original Hank Herron work?)

1 - Introduction

The argument in the concluding chapter relies upon one assumption and advances two claims. The initial assumption, which will be subsequently demonstrated through three examples, is that Art History is, like the space of the Art Gallery, a complex system of observation, differentiation and representation. In doing so this assumption follows on directly from the arguments of the opening chapter of the thesis in which a direct analogy was drawn between the Art Museum and the 'space' of Art History. In the preceding chapter particular claims where made about the systems of preservation and display of art in so far as they displayed certain systemic principles. It is argued below that the same patterns of systemic behaviour can be seen at work within the systems of Art History.

The arguments concerning the assertion that Art History behaves like a complex system operate by identifying and analysing key features of systemic behaviour in the system of Art History. These are; that the system of Art History is a distributed system of representation. And following from this is the conclusion that the discursive systems of the art world (including Art History[444]) are *locked-in* around certain concepts (that is that they have memory and inertia.)

In the preceding chapter the problem of the disappearing artwork was discussed by analysing *Spiral Jetty* as a system. When framed by a systems-theoretical perspective I argued that the dematerialisation of the singular artwork is best understood in terms of the ontological

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444 What is meant here is that art history and art criticism are sub systems of the system of art-discourse, and that art discourse itself is a system which has particular behavioural patterns which is discussed below.

subordination of the singular artwork to the distributed systems of both the art gallery and the complex artwork itself.[445]

Through the discussions of the Institutional Theory of Art it was demonstrated that the conditions for the existence of a work of art are not limited to the singular artwork alone. Instead the artwork needs to be conceived as a node in a network of preservation and display. Also, through the example of *Spiral Jetty* it was argued that the system of distributed representation by which the artwork was represented was robust enough to stand the dissolution of certain aspects of it, such as the submerging of the sculpture by The Great Salt Lake.

Such a dematerialisation raises a similar question to be asked of the discursive systems of art, such as Art History. This question concerns the dematerialisation of the identity of the singular Author in relation to their work; an author who is also implicated in these process of distribution and dissolution.

In what follows I will initially approach this question by initial invoking Foucault's question - 'What is an Author?' I will then provide an answer to this question by framing the answer from within both an Art Historical and a systems-theoretical perspective. In turn, I will formulate a

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[445] What I mean here is that when applied to art a systems-theory understanding will take the systems surrounding the artwork rather than the singular artwork itself as the fundamental conceptual object of analysis. Such an approach has similarities with Luhmann's claims for a sociology based on a Systems-Thinking approach which looks not to singular human subjects but social systems as fundamental objects of analysis. He says: "If one views [from a Systems-Thinking approach] human beings as part of the environment of society (instead of as part of society itself), this changes the premises of all the traditional questions, including those of classical humanism. It does not mean that the human being is estimated as less important than traditionally. Anyone who thinks so (and such an understanding either explicitly or implicitly underlies all polemics against this proposal) has not understood the paradigm change in systems theory." Luhmann, *Social* Systems, [trans. Bednarz & Baecker], (Stanford University Press, 1995) Pg. 212

response which is isomorphic to the question 'What is Art?' which was addressed from the Systems-Thinking approach a preceding chapter.

> Foucault has observed:
>
> Yet, what of a context that questions the concept of a work? What, in short, is the strange unit designated by the term, work? What is necessary to its composition, if a work is not something written by a person called an "author."[446]

Foucault treats the Author not in terms of the individual creative subject but instead as 'a function of discourse'. It will be argued below that such an argument can be re-stated from within the Systems-Theoretical perspective. By doing so it is proposed that the Author or Artist can also, along with the gallery and the artwork, be conceived of in terms of a function of a system rather than as a unique originating source in its own right. From this position I argued that, like the dematerialised *Spiral Jetty,* the author/artist need not be physically present in order to continue to be represented by the distributed systems within the artworld.

In response to Foucault's question the role of 'author' is taken up by the artist. In the following, I will discuss three examples of artists who are not, in different senses of the word, present. They are, like the post-modern art object, dematerialised. Nevertheless these artists have been re-presented by the distributed systems of art discourse (including art history) as the originating 'authors' of their work. And this tells us something of the ways in which these discursive systems function.

These three 'authors' are:

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[446] Foucault, 'What is an Author', (1969), in Preziosi (ed.), *The Art of Art History,* (Oxford University Press, 1998), pg. 301

1 – Rembrandt - An Artist who lived and exists in the system of the art world

2 – Nat Tate – An artist who never lived and did not exist in the art world system

3 – Hank Heron – An artist who never lived yet who did have a existence in the art world system.[447]

2 - Art History and the Author Function

Vasari famously put individual artist at the centre of his history of the 'Lives of the Artists.' In doing so he identified the work of art as the physical manifestation (and material mediation) of the individual subjectivity of the artist. Such a prioritisation of the artistic subject of the artist was dissolved in the various and subsequent attempts to provide a different set of criteria for historical reflection. These include analyses such as Wölfflin's 'Art History Without Names' which is explicit in its attempts to distance itself from being over-determined by biographical considerations. The desire to differentiate the critical act from questions of biography in favour of addressing more general cultural questions can also be seen in Riegl's analysis of the figure of the genius in Art as one who does not 'stand outside' the cultural systems within which art operates.[448] This is also revisited in Panofksy's iconological archaeology of social systems through their systems of artistic representation.

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[447] Contrary to a standard view that the examples used in this chapter are exceptions, or even distortions, of the normal discourse on art I propose that they are indeed paradigmatic for the general behaviour of the systems of art discourse.

[448] "Geniuses do not stand outside their national tradition, they are an integral part of it... The great artist, even the genius, is nothing but the executor, though the most perfect executor, the supreme fulfilment, of the *Kunstwollen* of his nation and age." Riegl, quoted by Pächt and cited by Holly in *Panofsky and the Foundations of Art History*, (Cornell University Press, 1984) pg. 75

Similarly, in her defence of a critical Art Historical method grounded in Formalist principles Krauss launched a critique on 'art history as a history of the proper name.' She has criticised auto-biographical Art History which singles out particular artists as the central focus for critical attention.

She says:

> It is as though the shifting, changing sands of visual polysemy, of multiple meanings and regroupings, have made us intolerably nervous, so that we may wish to find a bedrock of sense,[449]

and that this 'bedrock of sense' has been found by many writers in the identity of the author who provides the key, coherence or origin to a body of work.

> The identification of the author as the single and unique origin for

the work of art faced two major problems in its confrontation with the Modernist Art Object. The first challenge arises in the light of the pronounced autonomy of the Modernist art object. The proclamation that the Modernist art object can speak on its own terms, as defended by Greenberg,[450] means that qualities extraneous to the 'purely plastic or abstract qualities of the work of art' are negated; such terms might include not only the language of the art's iconography but also the biographical details connected to the author.

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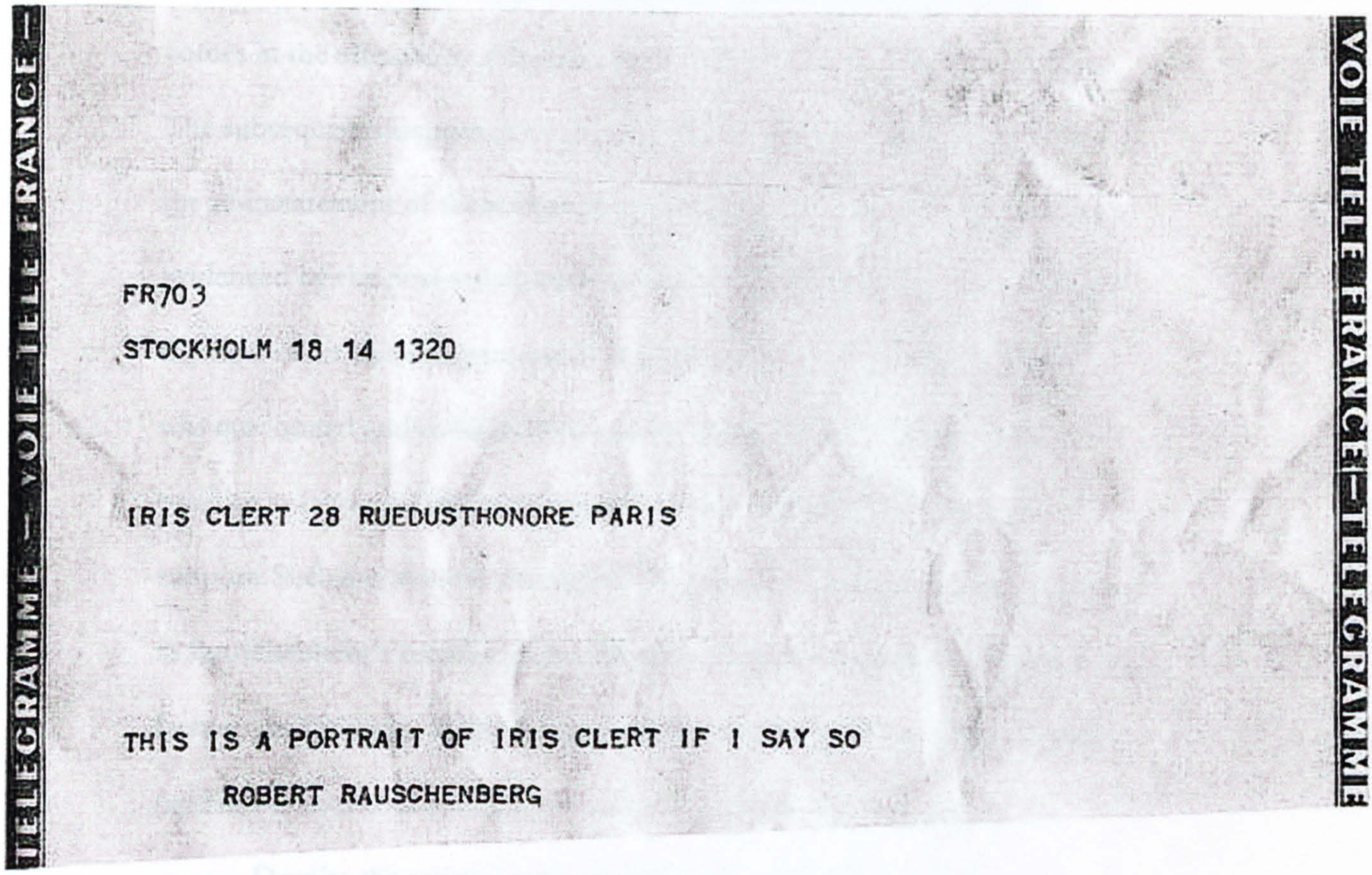
[449] Krauss, 'In the Name of Picasso,' *October*, 16, (Spring, 1981), pg. 5-22

[450] "The purely plastic or abstract qualities of the work of art are the only ones that count. Emphasise the medium and its difficulties, and at once the purely plastic, the proper, values of visual art come to the fore." Greenberg, 'Towards a Newer Laocoon,' (1940), in Harrison & Wood (eds.), *Art in Theory 1900-1990*, (Blackwell, 1992), pg. 555



Rauschenberg: *Portrait of Iris Clert*, (1962)

The second challenge to the Art History of the Proper Name comes in the aftermath of the demise in faith in the Modernist art object. The subsequent disappearance of the autonomous art object did not see the re-instatement of the author/artist as the prime origin of the work as is evidenced by the post-structural claims of the Death of the Author. Within the field of art this disappearance occurred when the Modernist art object was questioned and critiqued from within both artistic and art historical practice in favour of attention being diverted to the various systems of support. Such a critique is exemplified by a claim of artistic relativism such as Rauschenberg's sending of the telegram: 'This is a portrait of Iris Clert if I say so' in 1962 (see image on facing page) as a proxy for an absent object (and in which the artist himself is also distanced from the work.)

Despite the artistic statement of post-modernism such as Rauschenberg's it is in the face of the loss of the Modernist art object that the attractiveness of the Art History of the Proper Name might potentially increases. This is as a means by which to anchor attention and as a site around which a discursive system can become locked-in around the concept of the author. This is to say that given the loss of a discrete object the proper name of the artist can function from within a system of representation as a stand-in for the dematerialised art object; as it does in Rauschenberg's telegraph. However what also needs to be acknowledged is that this statement of Rauschenberg's does not stand as a reclamation of mastery of the artist over the act of representation. Whilst it acknowledges that with this work makes any easy differentiation between art object, artist and environment impossible it is also true that the work can only function because the figure of the artist depends upon the same continuum as the

artwork itself. This continuum is the system of representation within which object, artist and artworld environment are all incidents of representation.

2.1 In the Name of Rembrandt

The problem which the *Author Function* presents to the discursive systems of Art History is exemplified in the first of the three artists I will look at in this chapter, namely the work of Rembrandt.

The large body of Rembrandt's work presents several problems for the systems of art history to negotiate. Central to these problems is the very 'name' or persona of Rembrandt itself. Clearly the name and personality Rembrandt (like that of Michelangelo or Caravaggio for example) is inextricably bound up with the body of work referred to as 'Rembrandt'. This holds to such an extent that this art historical 'personality' (as opposed to his biographical or biological one) dominates much of the discourse. The most acute illustration of this is provided by the series of paintings for which he is arguably most famous. These are the self-portraits which he made throughout his life. In these portraits the person and artist 'Rembrandt' have themselves become something of the work of art; his personality has thus explicitly become the object of art historical discourse.

As Alpers has observed this raises certain questions:

> Individual uniqueness, monetary worth, aesthetic aura - the name of Rembrandt summons up different but nevertheless convergent notions of value. And to what precisely does the name itself refer? *Rembrandt* as it is commonly deployed tends to elide the works with the man. Is all of this a recent invention, a prejudice of the nineteenth century to which we are heir? Or is it appropriate to Rembrandt's own making a marketing of his own works that they should offer an example of that relationship between the

> production and valuing of a person, property, and aesthetic worth that lies so deep in our culture.[451]

The corpus collected under the name 'Rembrandt' thus provides us with an excellent example of the Art History of the Proper Name which Krauss had critiqued. Yet as I will further demonstrate this is an example which also subverts the operations of such art historical strategies.

The way in which Art History has dealt with such problems is of particular interest to my project as it concerns the identification of Systems within Art Historical practice. For it is in these negotiations that the very operations of those systems of Art History become obvious and are thus made available for scrutiny. In the following section I will use the work of the Rembrandt Research Project to demonstrate that within the systems of Art History the way in which the proper name 'Rembrandt' functions is as a descriptor within a complex representative system. In short for the whole body of work which makes up the corpus of 'Rembrandt,' and is archived under that name, 'Rembrandt' serves as an organising principle rather than as a signifier for a single originating source.

The Rembrandt Research Project (or RRP) was established in 1968 with a grant from the Netherlands Organization for the Advancement of Pure Research. It was born from a perceived need amongst scholars to scrutinise and possible reduce the large number of works, (which at one stage had reached over a thousand) attributed to the single source of Rembrandt. For there were clearly numerous works which did not originate from Rembrandt's own hand. As the RRP identified: "by the 1960s it was

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[451] Alpers, *Rembrandt's Enterprise*, (Thames and Hudson, 1988) pg. 3

difficult for an impartial eye to accept all the works currently attributed to Rembrandt as being by a single artist."[452][453]

One result of this process of differentiation which arose from the RRP's investigations was the establishing of three categories for further classification of 'Rembrandts'.

These were:

1 - those works identified beyond all reasonable doubt as being by Rembrandt himself

2 - those of uncertain authorship. (The Project acknowledged that this category was necessary but also pointed out that given its ambiguity this category should be kept as small as possible.)

3 - Those works identified as being *not* produced by Rembrandt. These works (previously accepted as being by Rembrandt) included works by his studio or after Rembrandt or fakes and pastiches which were also included in this category. Examples of these types of work include two works in the Hague now officially accepted as non-Rembrandts; these are *The Polish*

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[452] Rembrandt Research Project, *A Corpus of Rembrandt Paintings I*, (1982, Stichting Foundation/ Rembrandt Research Project) pg. I

[453] The activities of the RRP engage in issues similar to those faced by the Warhol Art Authentication board, a body which exists to secure the authenticity of Andy Warhol's work. A controversy concerning the board's activities was initiated when film producer Joe Simon tried to sell a Warhol self-portrait for $2 million. Apparently although the image was not signed it did bear a stamp of authenticity from Fred Hughes, Warhol's business manager and also had supporting paperwork. However on submitting the picture to the board for a guarantee of authenticity it was rejected. Given the nature of Warhol's practice this issue is both sensitive and complex. So far about 15% of the artworks re-appraised by the board have had their authenticity removed. It was reported in the Telegraph that: 'Ron Spencer, the lawyer for the authentication board, said that its role was to ascertain the "intent" of the artist... [and] that even if a work were printed by a number of other people the board would still classify it as genuine. "If Warhol conceived the idea and he then directed someone else to prepare a silkscreen, supervised the process of production and, in effect, signed off on it, as long as he said, *That's good, that's what I wanted*, Warhol created that work."' Quoted in, Catherine Milner, 'Collectors insist "our Warhols are genuine" *The Telegraph*, (filed: 26/10/2003) See also the originating article by Michael Shnayerson, in *Vanity Fair* (November, 2003)

Rider and *David and Saul* as well as *Man With the Golden Helmet* (Berlin) which was also formerly considered as being Rembrandt's own work.

The first stage of the RRP (between 1968-1972) involved collating all the information that existed for all works that were attributed to Rembrandt. This was done in the form of a literal description of each work and an accompanying photographic record. This meant that the RRP had a established and definitive body of works which were, at the time, recognised as 'Rembrandts'. In the second stage of the RRP's modus operandi this larger set of 'Rembrandts' was reduced to a much smaller number of works comprised of all those pieces that be said to consistently display having clear similarities to one another.

The initial information used by the RRP was taken from an established and recognised art historical archive. This was the catalogue of Rembrandt's work compiled by Bredius in 1935. The assumption was that this would, at the very least, contain all the works by Rembrandt in existence along with other work. In total this body of work of unproven provenance was estimated as being about a thousand paintings. It should be noted that the choice of Bredius catalogue already meant the exclusion of an even larger body of work based on 19th Century compilations that included works of dubious provenance which had nonetheless been identified, at some point, as 'Rembrandt'. By taking the task of defining and purifying Rembrandt's oeuvre as the guiding principle and ethos of their method the RRP have so far been able to reduce the number of what is 'accepted' as Rembrandt's work to below four hundred pieces.[454]

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[454] In collating their results the Rembrandt Research Project produced the five volume work *A Corpus of Rembrandt Paintings I-V* (Stichting Foundation/

Starting from this central question of attribution the members of the RRP then sought to establish working strategies by which to accommodate and address the particular problems that the Rembrandt corpus presented.

The first major problem with the corpus was what was generally understood to look like Rembrandt's work was (and still is) both highly distinctive and extremely well-known. As a result of that fame and recognition Rembrandt's originals have been much copied and any emulated in acts of homage, pastiche and fraud. The fact that there were many works referred to as 'Rembrandt' which, however, cannot beyond reasonable doubt be attributed to the hand of Rembrandt Harmensz van Rijn of Leiden who died in 1669 (for example the *Flayed Ox* at Kelvingrove Museum in Glasgow which until relatively recently was wrongly attributed to Rembrandt) makes the problem of attributing works of art to a single individual artist/author very clear.

And secondly the case study of Rembrandt and the RRP further highlights the problem of attributing works of art to specific historical individuals with regards to the issue of the unique autographed work. Common to working practice in 17th Century Holland, Rembrandt worked with a studio of apprentices and assistants; in fact he had over fifty students and assistants working for him during his working life.[455] This means that many hands may have worked on a work which was subsequently identified as an 'original' Rembrandt.

Rembrandt Research Project), which they hope to be the authoritative work of attribution.

[455] Alpers, *Rembrandt's Enterprise*, (Thames and Hudson, 1988), pg. 59

However attribution is a complex issue. On the one hand,

Rosenberg et al observed that:

> In the Night Watch and the Conspiracy of Julius Civilis - large pictures for which we could have used help - there is no evidence that a hand other than the original touched the original work.[456]

On the other hand they observed that Rembrandt's studio system was markedly different from that of, for example, Rubens. Rubens undertook large scale decorative projects (such as the decorations for the Luxembourg Palace, 1622) and as a result would have used a whole team of assistants as a normal working practice. The very fact that Rembrandt does not seem to have worked on such collaborative projects might be taken to suggest that in his case single works might indeed be attributed to a single, originating source.

However it is also known that Rembrandt worked closely with his pupils and that he often altered drawings they had made. Thus, consequently his hand may have been at work in a number of pieces which he neither started nor finished but which were instead executed in the main by students and colleagues. Further, as Rosenberg et al have claimed:

> It is difficult to determine how many Rembrandt school pictures are based upon the master's own inventions, but the number is probably high, and in a few cases a definite connection can be established.[457]

The examples they cite in order to give an impression of the way in which the studio operated include an engraving after the painting *Anna and*

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[456] Rosenberg, Slive, ter Kuile, *Dutch Art and Architecture 1600-1800*, (Yale University Press, 1966) pg. 142
[457] Rosenberg, Slive, ter Kuile, *Dutch Art and Architecture 1600-1800*, (Yale University Press, 1966) pg. 142

the Blind Tobit (1630, National Gallery, London). It is signed 'Rembr. van Rijn fecit' despite the fact that the original has been identified as having been painted by Gerrit Dou. Dou was a member of Rembrandt's studio and there is evidence that Rembrandt did add some cursory last minute touches to the painting. Those works which had been updated by the master were identified at the time as being 'retouched by Rembrandt.'[458]

These include the *Sacrifice of Isaac*, attributed to Govert Flinck, (the Pinakothek in Munich) which is based upon the master's treatment of the same subject matter (1635, Leningrad and a drawing in the British Museum).

According to Rosenberg et al:

> The inscription in Rembrandt's hand at the bottom of the Munich (*Rembrandt verandert En overgeschildert. 1636*) announces that the master was not satisfied with his pupil's results, and that he changed and retouched the work.[459]

The issue of Rembrandt's signatures, especially with regards to its appearance on work that didn't otherwise conform to the criteria of being 'Rembrandt' is one which the RRP diverted particular attention to as part of their attempts to provide empirical evidence for their attribution of works.

They say:

> In some instances they do come so close in form to that of an autograph signature that one wonders whether the artist may not also have put his signature on paintings produced, in his workshop and under his supervision, by others.[460]

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458 'van Rembrandt geretukeert', from the 1656 inventory of Rembrandt's effects, cited in Rosenberg et al (1966)

459 Rosenberg, Slive, ter Kuile, *Dutch Art and Architecture 1600-1800*, (Yale University Press, 1966) pg. 142

460 Rembrandt Research Project, 'A Descriptive Survey of the Signatures,' *A Corpus of Rembrandt Paintings I*, (1982, Stichting Foundation/ Rembrandt Research Project) pg. 59

The above quotation is taken from an article by the RRP on the unfinished painting, *Self-Portrait* from 1642 in the Royal Collection. The self-portrait was originally derived from another painting which Rembrandt began and then abandoned but which was later updated and thus 'finished'. The RRP have argued that such alterations provide further evidence of the work's originality since "traces of other paintings are found in approximately one third of Rembrandt's accepted self-portraits."[461]

This brief sketch of some of the working methods of the RRP leads me onto a more detailed description of how they conduct the process of differentiation and attribution. I propose that this process demonstrates a systems principle – namely that of representation; and more specifically distributed representation. But before I present this account in Systems-Thinking terms I first will outline in further detail the most relevant features of the working methods of the RRP.

The working method of the Rembrandt Research Project is based upon thorough empirical research supported by technical and scientific methods of material analysis. In doing so the RRP thus return to the materiality of the art object as the central focus for their interpretive method. The technical means that the Rembrandt Research Project have at their disposal to facilitate the process of attribution include:

dendrochonology (which is the dating of the wood of support on painted panels); x-ray imaging (to see earlier versions of the image including pencil sketching and so-forth); infra-red photography; microscopy (to identify

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461 van de Wetering & Broekhoff, 'New Directions in the Rembrandt Research Project, Part I: the 1642 Self-Portrait in the Royal Collection.' *Burlington Magazine*, vol. 138 (1), (1996) pg. 174-180

micro-details of the support); and autoradiography (in which a beam of neutrons is fired at the painting to help identify aspects of the layers of paint.) The rationale behind this was to seek to establish grounds for authenticity on material terms.

However although the project went to great lengths to provide rigorous empirical evidence for their attribution ultimately, the process of differentiation was not a purely technical one. Whilst the description of the paintings was primarily grounded in purely materialist terms (in terms of paint, canvas, frame etc.) which was practiced as being the most basic and fundamental act of investigation and differentiation this was, in turn, mediated by the interpretative act of art historical representation. It is a notable feature of the Rembrandt Research Project that it is composed not of scientists but of Art Historians. Therefore, as expressed by members of the RRP the interpretative act of historical evaluation does takes precedence over pure material empiricism:

> Apart from elementary information on the materials used, we have not attempted a systematic study of pigments, media, drying agents, dilutants etc; such studies may yield further specific technical information as analytical methods become more refined, though it remains to be seen whether the results will help solve problems of attribution. We have, rather, selected such information as can clarify the stratified structure of the painting as it results from the actual painting procedure.[462]

This refusal to rely upon purely technical data in the identification of the works was to allow for the foregrounding of particular interpretative reasons of attribution based on stylistic and qualitative evaluations on the part of the art historians.

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[462] Rembrandt Research Project, *A Corpus of Rembrandt Paintings I*, (1982, Stichting Foundation/ Rembrandt Research Project) pg. xi

The difference between a purely materialist and an art historical investigation and historical reconstruction is, according to the RRP:

> Provided by the differences in the sort of questions asked and the working method adopted by a scientist and an art historian, even when they approach the work of art as a shared object of study. Each is conditioned by the traditions of his own discipline. Without being unfair to either, we might perhaps say that the scientist arrives at his interpretation from relatively fragmentary and, of itself, unstructured information relating to the physical make-up of the work of art, while the art historian is concerned mainly with the stylistic interpretation of the picture and its execution. Their common frame of reference ought to be an understanding based on source studies, of the craft that governed artistic practice.[463]

It was also noted by the authors of the project that materialist accounts of the work in terms of attribution had already been well developed in Rembrandt studies, but that this was limited in so far as: "this is only seldom clearly related to what the art historian is seeking."[464] What the Art Historian is seeking, in this case, is the process of historical reconstruction. Thus the attribution of works to the Rembrandt corpus requires the interpretative act of the art historian (or historians in this case) to establish a coherency between works beyond that of mere materiality. This coherency can be identified as an organising principle in the systems of both the Rembrandt Corpus and larger Art Historical systems (such as art historical discourse, or the gallery system, and so forth). These grounds of authenticity are based on consistency amongst the accepted pieces of the corpus (within the system of Rembrandt). And if anything doesn't correspond to the organising principles then it is be deemed as inauthentic

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[463] Rembrandt Research Project, *A Corpus of Rembrandt Paintings I*, (1982, Stichting Foundation/ Rembrandt Research Project) pg. xii

[464] Rembrandt Research Project, *A Corpus of Rembrandt Paintings I*, (1982, Stichting Foundation/ Rembrandt Research Project) pg. xii

and hence not a 'Rembrandt.' This coherency is, in turn, achieved through the act of historical interpretation which thus requires the imposition of a narrative between the work and the 'Rembrandt' corpus. I propose that this narrative can be seen, from a systems-theoretical perspective, as a observation system which thus observes, represents and hence differentiates some works as belonging to the Rembrandt oeuvre and others as not; it does so around the organising principle of *paintings that look like Rembrandts.*

> As it can safely be assumed that Rembrandt and his shop assistants used the same materials and procedures, it was inevitable that the Members of the Rembrandt Research Project, like their predecessors, had to rely on connoisseurship in their attempt to distinguish autograph from workshop productions.[465]

Thus, in the attribution of identity the project invoked the working method of Morelli[466] who claimed that a process of attribution should be informed by the connoisseur's eye which was tuned to the smallest details of the work. In doing so the connoisseur would be able to identify the involuntary stylistic ticks and unconscious habits of the painter's style in otherwise similar paintings. In the case of Rembrandt however the analysis of attribution of works via brushstrokes was considered insufficient by the members of the RRP. This was for two reasons.

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[465] van de Wetering & Broekhoff, 'New Directions in the Rembrandt Research Project, Part I: the 1642 Self-Portrait in the Royal Collection.' *Burlington Magazine*, vol. 138 (1), (1996) pg. 174-180

[466] See, *Italian Painters*, in which Morelli, in the narrative guise of an elderly Italian traveller whom the author meets relates his thesis on the nature of a correct art historical method founded upon close attention to detail and informed connoisseurship. "A true knowledge of art is only to attained by a continuous and untiring study of form and technique, that no one should venture into the domain of the history of art without first being an art connoisseur." From Morelli, *Italian Painters*, excerpted in Fernie (ed.), *Art History and its Methods*, (Phaidon, 1995) pg. 110

1 – Unlike the art of the Renaissance, which Morelli concentrated on, Rembrandt did often not work on the incidental details of his paintings but instead left such matters to be completed by his studio.

2 – Rembrandt's brushwork was (and still is) highly distinctive. For this reason it is one of the characteristics of his art that was most appropriated by students and members of the studio, copied by contemporaries and those whom he influenced and parodied by forgers. This makes subsequent attributions based on attributes of his handling of pens and brushes highly problematic.

It was because of the problems in using techniques of the artists hand, such as brushstrokes, that the Rembrandt Research Project required a different conceptual organising principle by which to differentiate the *paintings that looked like Rembrandt* from other works of art. In doing so they turned, ultimately, to questions of 'Style.' This was complicated procedure because the Rembrandt Corpus had become locked-in around the style of Rembrandt; hence the need for the project's work in first instance[467]

In summary of the above it is stated that the working method of the Project was an intricate process of differentiating those paintings from

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[467] 'The process of illegitimate accretion to the oeuvre, which took place in the 18th and even as early as the 17th century, can be glimpsed from the prints put out in those years and purporting to reproduce paintings by Rembrandt. When John Smith published the first catalogue of the paintings, in 1836, his work inevitably reflected a corrupted tradition and consequently gave a distorted view. Eduard Kolloff (1854) and Carel Vosmaer (1868) deserve credit for bringing some kind of order into chaos, as Scheltema had done for biography; but it was particularly the young Wilhelm Bode who, in the 1880s, produced a corrected image of Rembrandt's work, especially that from the early years.' From: Rembrandt Research Project, *A Corpus of Rembrandt Paintings I*, (1982, Stichting Foundation/ Rembrandt Research Project) pg. Ix. Other names which are cited as providing the foundations for the body of work accepted as 'Rembrandt' at the time of the beginning of the Rembrandt Research Project include: de Groot (1915), Sedelmayer (1897-1905), Bauch (1966), Wurzbach (19110, van Dyke (1923).

the larger corpus which appeared to be sufficiently 'Rembrandt-esque'[468] and not an attempt to identify a *single* authorial voice manifest in all of them. To the contrary, RRP tried to determine a set of *multiple* criteria that all the works within the oeuvre of 'Rembrandt' would display.

Thus a 'Rembrandt' is not defined by virtue of an external reference which the work signifies; i.e. Rembrandt the artist. The process of attribution and differentiation instead functions according to the criterion of internal coherence within the system 'Rembrandt'. And it is due to this internal coherence that a unity emerges among the works of the Rembrandt system regardless of whether they were painted by one artist or not.

Paradoxically the focus on style could also be interpreted as an (if only unintentional) return to the author in art history. As Bal has concluded on the work of the Rembrandt Research Project:

> True, some Rembrandt critics (the members of the Rembrandt Research Project are among them...), voluntarily question the quality of some of the works, and even take pride in their demythologising attitude. Yet the very fact that these aesthetic criticisms lead to the rejection of the authenticity of the works as *Rembrandt* provides evidence of the basically unchallenged status of both author as genius and of aesthetic quality as determinable. Hence these acts of judgement rest on the possibility to delimit *high art* from other art. An ever *higher* purer Rembrandt is thus safeguarded.[469]

And:

> That many of these works are now in the process of being disavowed as part of the Rembrandt does not bother me; it rather supports my argument that *Rembrandt* is a cultural text rather than a

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[468] Broos and Alpers have identified that there are three broad types of 'Rembrandtesque' paintings which show his influence both materially and conceptually. Alpers identifies these as: '(1) Study heads taken home by pupils, (2) copies after Rembrandt and (3) paintings by the assistants sometimes perhaps even signed and sold as Rembrandts.' See Alpers, *Rembrandt's Enterprise*, (Thames and Hudson, 1988) pg. 125. Broos, 'Fame Shared is Fame Doubled,' in *Rembrandt Impact of a Genius*, (1983,), pg. 41

[469] Bal, *Reading Rembrandt*, (Cambridge University Press, 1994) pg. 7

> historical reality. *Rembrandt* constitutes these works and the response to them, responses that range from their mistaken attribution to attempts to challenge their authenticity on the basis of a holistic and elitist concept of authorship.[470]

However although the RRP take the question of authorship as a starting point, their conclusions demonstrate that ultimately rather than being defined purely in terms of either materiality, or the individuality of the artist *Rembrandt* is instead a product of the discursive systems of the artworld. This highlights the role which these systems play in the processes of art historical observation, representation and differentiation.

2.2 In the Name of Nat Tate

On March 31st 1998 a party was held in Jeff Koons' SoHo studio in New York. Amongst the art dealers, writers, agents and other usual figures who attend such events were several high profile guests including the artists Julian Schnabel and Frank Stella, the author Paul Auster and David Bowie.

The party had been arranged by Bowie's publishing company (*21 Publishing*) to celebrate the publication of William Boyd's biography of Nat Tate, an 'American Artist' who had died in 1960. Bowie read several extracts from the book to the audience. Boyd's book provided a brief biographical sketch of this would-be mythical figure from the history of American Modern art. The story was illustrated by photographic images of the time, some documenting Tate and others key figures from the story, and three of Tate's own works. The works reproduced showed two drawings from Tate's series of over 200 images said to be inspired by Hart Crane's epic poem, *The Bridge*. The third image was an abstract oil painting

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[470] Bal, *Reading Rembrandt*, (Cambridge University Press, 1994) pg. 8

called *Portrait of K*, reputed to have been painted in 1958 in a drunken frenzy; the style appeared to be reminiscent of Abstract Expressionism, although in the text the work was referred to as Abstract Impressionism.[471]

Nat Tate the man, however, never existed. The whole event had been part of an intended joke to play on the culterati of New York. The scheduling of the party on the day before April Fool's Day had been a deliberate attempt to place the story in the next mornings papers. The intention had been to coax those at the party into claiming to have heard of the (fictional) figure of Tate and for the papers to replicate this mistake the following morning. Karen Wright, a co-publisher of the book said:

> Part of it was we were very amused that people kept saying, "yes I've heard of him". There was a willingness not to appear foolish. No one wants to admit that they've never heard of him. But critics are too proud to admit that.[472]

However, as *The Times* reporter in New York related the joke fell a little flat:

> But the hoax did not come off. The party went with a swing, but not one word appeared in any of the newspapers the following day. Or even the day after. Clearly, no-one had taken it seriously. Reports have now filtered through from London to the effect that The Independent carried a front-page story about how the novelist "fooled the US art world". The Evening Standard followed suit. But the question everyone here is asking is: What Hoax?[473]

The Independent was indeed the first paper to break the story a week late on April 7th, although *The Telegraph* had serialised some of Boyd's book the

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[471] *Abstract Impressionism* was the description which Elaine de Kooning had used to describe the early colourful painterly abstraction of Phillip Guston. See Elaine de Kooning, 'Subject; What, How or Who?' *Artnews* (April 1955); cited in Sandler, *The New York School* (Harper and Row, 1978) pg. 55

[472] David Lister, 'How a British Novelist Fooled the US Art World,' *Independent*, (April 7th, 1998), pg. 15, 16

[473] Tunku Varadarajan, 'British Joke Falls Flat in New York,' *The Times*, (April 8th, 1998), pg.11

previous week. This was followed up two days later with another story under the congratulatory headline: 'London Partygoers Revel in Hoax that took in New York's Smartest'[474] under which it was reported that, 'one branch of Waterstone's bookshop reported yesterday that it had had numerous requests for the "book about the American artist written about in The Independent."'[475]

All things considered the joke of Nat Tate appears not to have fooled a gullible artworld into believing in the existence of an artist who never lived. But, equally, neither did it appear to be a totally incredulous story. There was something about Nat Tate that did seem at least in some sense plausible. One only needs to compare his story with that of the real-life 'lost' Abstract Expressionist John Schueler, a painter under the tutelage of Reinhardt, Rothko and Guston, who was also a jazz musician and who was described in the very recent catalogue of his first one man show in the UK (2003) as:

> A well established member of the younger generation of the New York School by the time Leo Castelli, an influential art dealer, opened his first gallery with a Schueler exhibition in 1957. The authors of the catalogue even go on to say that had Schueler stayed in New York, his career would have progressed in step with his more famous friends.[476]

Scheuler instead chose to move to Mallaig and obscurity on the west coast of Scotland meaning that his work, like that of Nat Tate, drifted out of the systems of Art History.

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[474] David Lister, 'London Partygoers Revel in Hoax that took in New York's Smartest,' *The Independent*, (April 9th, 1998)
[475] David Lister, 'London Partygoers Revel in Hoax that took in New York's Smartest,' *Independent*, (April 9th, 1998)
[476] *To the North: Paintings by John Schueler*, Brochure to the Exhibition at City Art Centre, Edinburgh, (5th July – 27th September, 2003)

The life story of Nat Tate used a series of motifs common to the typical biographies of Art Historical discourse. They occur with regularity within the system(s) of art historical biography and thus become representational tropes which constitute and demonstrate a systems principle. In other words such narrative tropes are organising principles around which the systems of biographical Art History writing are 'locked-in.'

What follows are six such principles to be found in the narrative of Nat Tate's life. It is easy to illustrate how typical these principles are to art historical biographies in general. This is illustrated by the fact that some of these six principles are also applicable to the real-life figure of Schueler (with the exception of Schueler dying early and being an orphan.)

1. Firstly Nat Tate was a solitary figure who, like Van Gogh or Rembrandt did not receive the fame which he deserved in his own lifetime heightening the tragedy of his story.

2. Secondly he was firmly embedded in the art world milieu of the Abstract Expressionists, supposedly having been tutored by Hoffman, written about by Greenberg (who called his work 'promising, oddly disturbing…'), slept with by Peggy Guggenheim and befriended by Jackson Pollock. He was thus a suitable candidate to bask, posthumously, in their reflected glory.

3. Thirdly, like Jackson Pollock, Tate was the existential hero of his own drama who was tortured by the twin torments of his genius and his

alcoholism. One only needs to see Ed Harris' hagiographic film *Pollock* (2001) to see how pervasive this notion is.

4. Fourthly he witnessed a moment of artistic epiphany. In 1959 Tate was said to have visited Braque in Normandy. A photograph in the book corroborated this meeting at which Tate was reported to have seen Braque reworking a much older canvas. It was this, Boyd reports, which lead him to his final artistic statements by attempting to radically rework all the previous work which he could get his hands on:

> Throughout December 1959 it is clear that Nat Tate tried to buy back or asked to be allowed to "rework" as many as possible of his paintings as were in public hands. There is no reason to doubt that he was sincere in this regard, that it was not, in Mountstuart's words, "little short of theft". Nat Tate had seen Braque at work, had witnessed his tireless and dogged perfection at first hand, and it is entirely conceivable he was inspired by Braque's example. In any event, he locked himself away in his Windrose studio and worked uninterrupted through the holiday season and into the early days of 1960.[477]

Tate's reworking of his art actually meant the destruction of his paintings; and this suggests a fifth narrative trope at work in the story of Nat Tate.

5. Conveniently practically none of Tate's work was left after his suicide. The story of Tate as an heroic, 'lost' artist is undoubtedly helped by this as there was very little material evidence that could have been used as evidence to disprove his 'genius'. This was a trick of artistic re-invention which can be seen in the oeuvres of Malevich and Hans Hoffman whose reputations benefited from being their early work having been fortuitously

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[477] Boyd, *Nat Tate An American Artist: 1928-1960*, (21 Publishing Limited, 1998), pg. 56

destroyed[478] and their subsequent reputations having been generated in the absence of paintings dating prior to the mature phases of their work.

6. Tate had taken his own life by leaping from the Staten Island Ferry in New York on January 12th, 1960. This motif of the suicidal artist can be seen in the lives of Gorky and Rothko and has a specific narrative similarity to the poet Hart Crane's drowning after jumping off a steamboat in the Caribbean in 1932. That Tate was an orphan who was only 32 years old when he died only serves to heighten this tragedy.

Yet despite displaying all of the above persuasive and convincing biographical characteristics, Nat Tate never gained credibility. However, that the fact that Tate did not exist as a 'real-life' person was not the reason that his story lacked plausibility. Rather it was because his story never gained the required credibility within the systems of art history. His story was never convincing enough for him to 'exist'.

The third and final example of authorship within the discursive systems of the art world will demonstrate what this credibility entails. As will be shown, the artist can indeed have a historical 'existence' in the systems of art discourse.

The example of the Artist Hank Heron demonstrates once more that the discursive systems of the art world and more specifically the system(s) of Art History are best understood as distributed systems of representation. In fact it is their distributed nature that makes them robust

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[478] This process of artistic re-invention has been revisited at least twice in the last forty years by John Baldessari's Cremation Project (in which he burned his previous work) and Michael Landy's *Breakdown*, (2001)

enough to sustain themselves in the absence of the artist (as a person who lived) without losing the *figure* of the artist/author around which a body of work may be locked-in.

2.3 In the Name of Hank Heron

Hank Herron was an artist who never lived. He was written about by a critic Cheryl Bernstein who also never lived. But both existed.

As will become clear from what follows, however, in terms of the discursive systems of art both Herron and Bernstein had a particular type of existence in the discursive systems of art. For unlike Nat Tate both Bernstein and Herron gained enough credibility for the discursive systems of the art world[479] to 'lock-In' around them. They became, like Rembrandt, representations within art discourse.

Both Herron and Bernstein were invented by the Feminist critic and author Carol Duncan (with her husband Andrew Duncan) in 1970. In her brief written introduction to the anthologised versions of the two articles that appeared under Bernstein's name ('The Fake as More' and 'Performance as News,'[480]) Duncan explains that Bernstein came about in response to the contemporary house style of *Artforum* which was 'widely regarded as the most theoretically advanced publication,'[481] yet which also often seemed to sacrifice explanation for erudition in its defence of contemporary art.

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[479] And by this I mean writing on art to include both art history and art criticism both of which form part of a discursive system connected to art (see footnote 444 above).

[480] Both 'The Fake as More,' and 'Performance as News' appear in the anthology of Duncan's work; Duncan, *The Aesthetics of Power*, (Cambridge University Press, 1993)

[481] Duncan, *The Aesthetics of Power*, (Cambridge University Press, 1993)

Cheryl Bernstein made her first appearance in print as the author of the article, 'The Fake as More,' which was a review of the work of the unknown but up-and-coming artist Hank Herron. Bernstein described Hank Heron as:

> A white, Anglo-Saxon New Englander seeped in modernist art and criticism, and making a debut in one of those stylish and expensive galleries that could count on critical attention from the high-art press.[482]

Herron's work was said to consist of nothing more than the exact replication of every art work that Frank Stella had produced up to that point in time. Yet the work was completed by Frank Stella over a ten year period (from 1961-1971); whereas Heron had taken just a year to complete the process of duplication. They were perfect fakes. And all the more profound for being so as Bernstein helpfully explained:

> On second viewing, one begins to be more profoundly conscious of and receptive to a radically new and philosophical element in the work of Mr Herron that is precluded in the work of Mr Stella, i.e., the denial of originality, both in its most blatant manifestation (the fake as such) and in its subtle, insouciant undertones of static objectivity (the telescoping of time.) ... Mr Herron's art is neither deepening nor broadening nor, if anything, joyous. On the contrary, it is surface, narrow, and, most especially, tragic, for one is forcefully reminded at every line and turn that it represents the ontological predicament of our time, indeed of every living being: inauthentic experience. They are, in a word, fakes.[483]

These appropriations of Stella were the first works on public display by Herron. Thus there were no other pieces from his existing 'oeuvre' with which to compare this work and it was impossible to distinguish the two artists. After all, Herron's style was Stella's style alone. In this act of naked

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[482] Duncan, *The Aesthetics of Power*, (Cambridge University Press, 1993) pg. 212
[483] Cheryl Bernstein, 'The Fake as More,' in Duncan, *The Aesthetics of Power*, (Cambridge University Press, 1993) pg. 216-218

appropriation Herron appeared to have taken Stella's famous statement 'what you see is what you see,' and purified it by removing all authorial connotation. He thereby seemed to have carried out Stella's project more successfully than Stella ever could. Stella had attempted artistic non-representation[484] but had always fallen short due to his own factual presence and status. All his works in fact did symbolically refer to something beyond themselves: to Stella the artist and to Stella the 'oeuvre' (just as the proper name Rembrandt does for the Rembrandt system).

Hank Herron's works on the other hand, could not be Stella the man because they had supposedly originated from the hand of Herron. They were thus free from the symbolic function of representing 'Stella' and referred instead merely to themselves – they were, when regarded visually, truly non-representational. And likewise neither could Heron be considered the author of the works as they were on visual terms alone utterly indistinguishable from the works by Stella. Herron had added nothing to the visual experience, had no creative input, and could not be considered the 'author' of the patterns in all but the most general sense. It seemed therefore that Herron had 'out-Stella-ed Stella,' whose work from the 1960's was indicative of, according to Leider:

> A cold, smartaleck, humourless, methodicalness that showed up, in the paintings he finally exhibited at the Museum of Modern Art in 1960 like a slap in the face. The Paintings were insufferably arrogant. They seemed to reiterate nothing but insultingly simple principles that only his paintings, however, seemed to understand.[485]

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[484] For a fuller discussion of Stella and non-representation with reference to the concept of Literalism see Philip Leider, 'Literalism and Abstraction: Frank Stella's Retrospective at the Modern.' In Frascina & Harris (eds.), *Art in Modern Culture, an Anthology of Critical Texts*, (Phaidon, 1992) pg. 319-325

[485] Philip Leider, 'Literalism and Abstraction: Frank Stella's Retrospective at the Modern.' In Frascina & Harris (eds.), *Art in Modern Culture, an Anthology of Critical Texts*, (Phaidon, 1992) pg. 322

Further despite (or maybe even because of) the cool irony of Herron's gesture it didn't seem incredible that such an artistic action could have taken place. One only needs compare Herron's gesture with that of the actual practice of artists such as Mike Bidlo, Malcolm Morley or Sherrie Levine all of whom have used a strategy of appropriating images (such as Piacasso, Vermeer and Walker Evans) in their work.[486]

In Herron's case this lack of the actual objects of his work only served to heighten the overall credibility of him as a figure, as Duncan explained:

> Indeed, so fully theorised was Herron's work, that its physical absence from the art world would become a positive asset in the elaboration of its meaning. Never at any time would anyone wish to see the actual work or even wonder where it could be glimpsed.[487]

Having been written as a parody Bernstein's (or Duncan's?) article was first circulated in photocopy form amongst various people until it came to the attention of Gregory Battcock. Battcock included the paper in *Idea Art* which was his collection of articles on conceptual art first published in 1973. Battcock thereby made a major contribution to the subsequent 'lock-in' around Bernstein/Herron which ensured their subsequent existence within the discursive systems of the art world.

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[486] In the thorough discussion of Hank Herron given by Thomas Crow in 'The Return of Hank Herron: Simulated Abstraction and the Service Economy of Art,' Crow discusses the resonance between the imagined practice of Herron and the actual practice of appropriation artists such as Levine and Sturtevant (and artist who actually did copy Stella's paintings,) in relation to the internal economy of the art market in the 1980's. In Crow, *Art in the Modern Culture,*(Yale University Press, 1996)

[487] ibid. pg. 212

Soon people began to talk about Herron as a if he were a real artist (which by now he was, in a certain sense, in the process of becoming.) The systems of discourse were becoming 'attracted' (in the sense of an attractor within a complex system) to the figures of both Herron and Bernstein who became 'real' attractors within the complex system of art discourse and its subsystems of art criticism and art history.

In her later commentary on the affair Duncan commented that Bernstein had developed an autonomous identity independent of Duncan:

> The concept of authorship has become in any case difficult to sustain .... Bernstein said things for me that I could not easily say. She brought difficult truths to light and then buried them again. Certainly she owes much to me, but whatever her debt, her life unfolded quite independently of mine. She established her own relationships (admittedly, they were one way), *entered into the discourse of art criticism* and helped more than one individual find his or her own critical or artistic path...
> On the basis of only two published texts she became a minor celebrity, a marginal but significant critical force in the art world, and, recently, the object of intense critical study. At present, the literature about her stretches several time the total length of her collected oeuvre. More interesting than her writing per se is Cheryl Bernstein the narrative construct.[488]

In summary of the above: we can see that in the figure of Herron two themes of this and the preceding chapter are brought together - the dematerialised art work and the dematerialised artist. Yet this did not mean that Herron as an historical figure did not exist within the discursive and historical representational systems of the art world. This serves to illustrate that in ontological terms the figures of both the artist and the critic are like that of the artwork itself – namely relative to the representative systems which they are both subordinate to and constitutive of.

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[488] Duncan, *The Aesthetics of Power*, (Cambridge University Press, 1993) pg. 211

3 - 'LOCKED-IN' ART HISTORY

In concluding I return to the two leading claims of this chapter.

These are:

1 - Discourse *in general* displays certain systemic principles and can therefore be understood in terms of a systems-thinking approach as a complex representational system.

2 - Discourses on art *in particular* can equally be understood in these terms. This is to say that discursive systems are complex systems too; and they will therefore display behavioural patterns common to all complex representational systems.

In the above examples this correlation was demonstrated by two examples. Firstly it was shown *that* it was precisely due to their distributed nature that the discursive systems of art were robust enough to accommodate the absence of the artist as a person who lived. Secondly it was shown *how* these distributed discursive systems could become, like other systems, 'locked-in' around certain concepts and behavioural patterns. In the above examples discursive systems of art had become 'locked-in' around certain narrative tropes, such as the method of 'art history of the proper name' or common expectations of typical biographical motifs within art history, and also around particular artists, such as Rembrandt and Herron (but not Nat Tate).

Underlying all of these arguments is the claim that by identifying discourse on art as a subsystem of the system of art on can then recognise its behaviour as isomorphic to other complex systems. More specifically it is argued that isomorphic behaviour can be identified across all of the complex systems which feature in this thesis. These include: the art

work/art works; the art gallery/museum; and discourse on art. In fact, even my thesis itself constitutes a part of this whole as it operates according to the concepts of the discursive systems of art. It too is 'locked-in' around certain fundamental concepts (namely, art, art history, and systems-theory).

The recognition of these isomorphisms across the different systems of art enables one to map the behavioural of one system onto other systems. Thus it is revealed that the isomorphic artistic systems of representation, display and preservation of the art world are all locked-in around the concept of art. The very ambiguity of the concept of art serves to highlight that the processes of representation, differentiation, display and preservation take place across the various systems of art. Consequently the meanings of the concept of art in the sub-systems of the artwork, the gallery and art discourse are systematically related and cannot be understood in isolation from one another.[489]

Furthermore Thomas Crow has observed, processes of positive feedback and 'lock-in' (as observed by W. Brian Arthur at play in particular financial markets) are at work in the art market too. Crow wrote:

> While governments and large corporations have plainly acquired a stake in contemporary art, the financial risks are miniscule by comparison.
> [with for example both the film industry and professional sports, both of which, Crow observes, 'demand elaborate forms of concentration, monopoly and state intervention in order to secure the enormous financial commitments involved. Whereas]
> With their low costs of entry and potential for exponential returns, the fine arts seem closer in this respect to computer software, our era's most potent form of intellectual property. Art seems similarly well adapted to a world in which markets are completely internationalised, politics are subordinated to them, and economic

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[489] In addition these process of differentiation, whilst related to art in the systems outline above, are not unique but are also observable across a range of complex systems including those studied in biology, physics, economics and cognitive science – and so forth.

> exchanges, unconstrained by time and space, are expressed in disembodied, quasi-fictional forms of information transfer.[490]

Curiously, the economy of art is described here by Crow in almost the exact same terms in which William Burroughs described the economy of the heroin market. This could be taken to mean that art, like heroin, is one of the most exemplary expressions of the commodity system. They are both 'things which don't need any advertising'.[491] Perhaps then positive feedback in cultural systems (manifested in cultural and systemic memory, in irreversibility and ultimately cultural inertia) can be understood as a type of systemic 'addiction'. Thus Crow's claim that "The art world's continual circulation of information and services has become a primary source of profit in itself"[492] explains how the economy of the art market has 'locked-in' around particular cultural paradigms and has become a systems which is self-organising and self-perpetuating (which is to say, in systems-theory terms, auto-peoetic). Extending this analogy further the other systems of the artworld, including art discourse, are not only 'locked-in' around art they are addicted to it too.

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[490] Thomas Crow, 'The Return of Hank Herron: Simulated Abstraction and the Service Economy of Art,' in Crow, *Modern Art in the Common Culture,* (Yale University Press, 1996) pg. 79

[491] 'Junk is the ideal product . . . the ultimate merchandise. No sales talk necessary. The client will crawl through a sewer and beg to buy. . . . The junk merchant does not sell his product to the consumer, he sells the consumer to his product. He does not improve and simplify his merchandise. He degrades and simplifies the client. He pays his staff in junk. Junk yields a basic formula of "evil" virus: "The Algebra of Need" The face of "evil" is always the face of total need. A dope fiend is a man in total need of dope. Beyond a certain frequency need knows absolutely no limit or control. In the words of total need: "Wouldn't you?" Yes you would. You would lie, cheat, inform on your friends, steal, do 'anything' to satisfy total need. Because you would be in a state of total sickness, total possession, and not in a position to act in any other way.' Burroughs, *The Naked Lunch*, (Flamingo, 1986)

[492] Thomas Crow, 'The Return of Hank Herron: Simulated Abstraction and the Service Economy of Art,' in Crow, *Modern Art in the Common Culture,* (Yale University Press, 1996) pg. 82

That the discursive systems of art are locked-in or addicted to the concept of art is something which has come under scrutiny in the ongoing debates concerning visual culture studies and the reconfiguration of art historical practice; a debate which is still an unresolved exchange of claim and counter-claim and which will not be revisited here. What I will take from these ongoing debates however is the non-trivial observation that art history requires both a concept of Art and of History in order to function in a recognisable form (distinct from other academic disciplines).

As de Duve has claimed:

> Whatever the history of art – most often indeed the history of styles – does, it postulates (when it doesn't simply prejudge) the continuity of its substance, the invariance of its concept, the permanence of its foundations, and the unity of its limits. You are a historian of art and this is why, even though (all things considered) you don't know what art is, as far as you are concerned its history must be cumulative. Despite changes, even despite revolutions, the history of styles, accumulated in the mass of things that humans have called art over the course of time, appears to you as a cultural heritage. It belongs, you say, to humanity, and this is why your discipline is humanist. It is made up of objects but also of relations between those objects, ties of filiation, hinges of influence through which history obeys its own causality, broken influences and new departures through which art renews itself, naked as on the first day... As a humanist historian, you redefine this corpus historically: it is a patrimony. Its manifest heterogeneity gives way to its cumulative continuity, which is grounded on the fact that an essence called art maintains itself unchanged through a succession of avatars.[493]

Finally it should also noted that there is a political dimension to the critique of such discursive 'lock-in'/'addiction' by couching the arguments in terms of cultural inertia as equated with hegemony and power. Donald Preziosi has argued that the attractor Art, which I have identified here as a concept around which the systems of the artworld are 'locked-in', is part of a more

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[493] De Duve, 'Art was a Proper Name,' in *Kant After Duchamp*, (MIT, 1996,) pg. 8-9

general language of dominant cultural forms/norms. It is, in short, part of the 'Esperanto' of western hegemony and power relations. He stated:

> On a global scale art has come to be a universal method of (re) narrativising and (re) centring "history" itself by establishing a standard or canon (or medium, or frame) in or against which all peoples of all times and all places might be seen together in the same epistemological space.[494]

And it is through identifying such hegemony in terms of the principles of the Systems-Theoretical perspective that the potential for an engagement with such power structures of differentiation and representation can be realised with force and with efficacy.

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494 Preziosi, 'Collecting/Museums', in ed. Nelson & Shiff, *Critical Terms for Art History*, (University of Chicago, 1996) pg. 289

Conclusion

In this thesis I set myself the task of working within the parameters of a particular problematic: that of the uneasy relationship between a discursive system and the objects which that system observes.

More specifically I concerned myself with the particular problem of the difficult relationship between Art after Modernism and a discourse (namely English language art history) which, as it is commonly practiced, remains largely structurally unaltered since its foundations in modern times. It is thus, I argued, insufficient in dealing with the ambiguities and complexities of post-modern artistic practice. In other words I worked from the assumption that art after Modernism challenges us to find new critical paradigms by which to account for it. It has been my attempt to investigate the Systems Theoretical approach as such a paradigm.

From a personal perspective this questioning took the form of a search for a particular artwork; Robert Smithson's *Spiral Jetty*. In April 2003 I visited Utah in order to find *Spiral Jetty*, document its physical appearance and report my observations at a conference at the University of Utah.[495] This journey was a fitting place for me to finish my studies; for the question of finding an appropriate strategy (or system) by which to observe the complexities and ambiguities of Robert Smithson's work was what had motivated me to begin my post-graduate research in the first place. It had seemed to me that to observe such work in traditional art historical terms (such as: visual iconography, style, biography and so forth) simplified the radical and unstable systemic complexities that were a central feature of the work. Likewise I argued that a post-structural analysis, such as that of

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[495] Smithson himself had given a presentation at the University of Utah in 1972, (to architectural students on his fascination with the allegorical form of the architecture at the Hotel Palenque.)

Owens (who is a subtle and sophisticated reader of Smithson), over-prioritises a textual understanding of the work and thereby runs the risk of negating its multi-sensory and systemic qualities. Thus, my journey across the Atlantic and then to the edge of the Salt Lake became an allegory for the research and exploration that had brought me to that place.

Articles in local Utah papers and the New York Times Magazine[496] had reported that the Jetty had emerged from the lake once more. The pictures were seductive. Since re-appearing the spiral had become covered in salt and was now elegantly frosted with an icing of crystals.[497] However on finally reaching my destination it transpired that the Salt Lake had reclaimed the *Spiral Jetty* once again. Standing on the edge of the Great Salt Lake in Utah I looked in vain for it. Throughout the thesis I tried to investigate the potential of the systems-theoretical perspective as a new discursive system from which to observe, and thus rediscover, *Spiral Jetty.*

The process does not end here though. This thesis has two parts; both of which can develop and evolve from the outlines presented here. In the first half of the thesis, having first introduced the central problem (that of observation,) I outlined some of the conceptual implications of the Systems-Theoretical approach to be applied as an art historical strategy. The two most striking features of it are, I argue, its contemporaneity and its

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[496] Micheal Kimmelman, 'Out of the Deep,' *New York Times Magazine*, (Sunday, Oct. 13th, 2002), pg. 40; Orme, 'Utah Excursions: Spiral Jetty Vies With Nature's Otherworldly Art on Great Salt Lake,' *The Salt Lake Tribune*, (Sun., January 26, 2003)

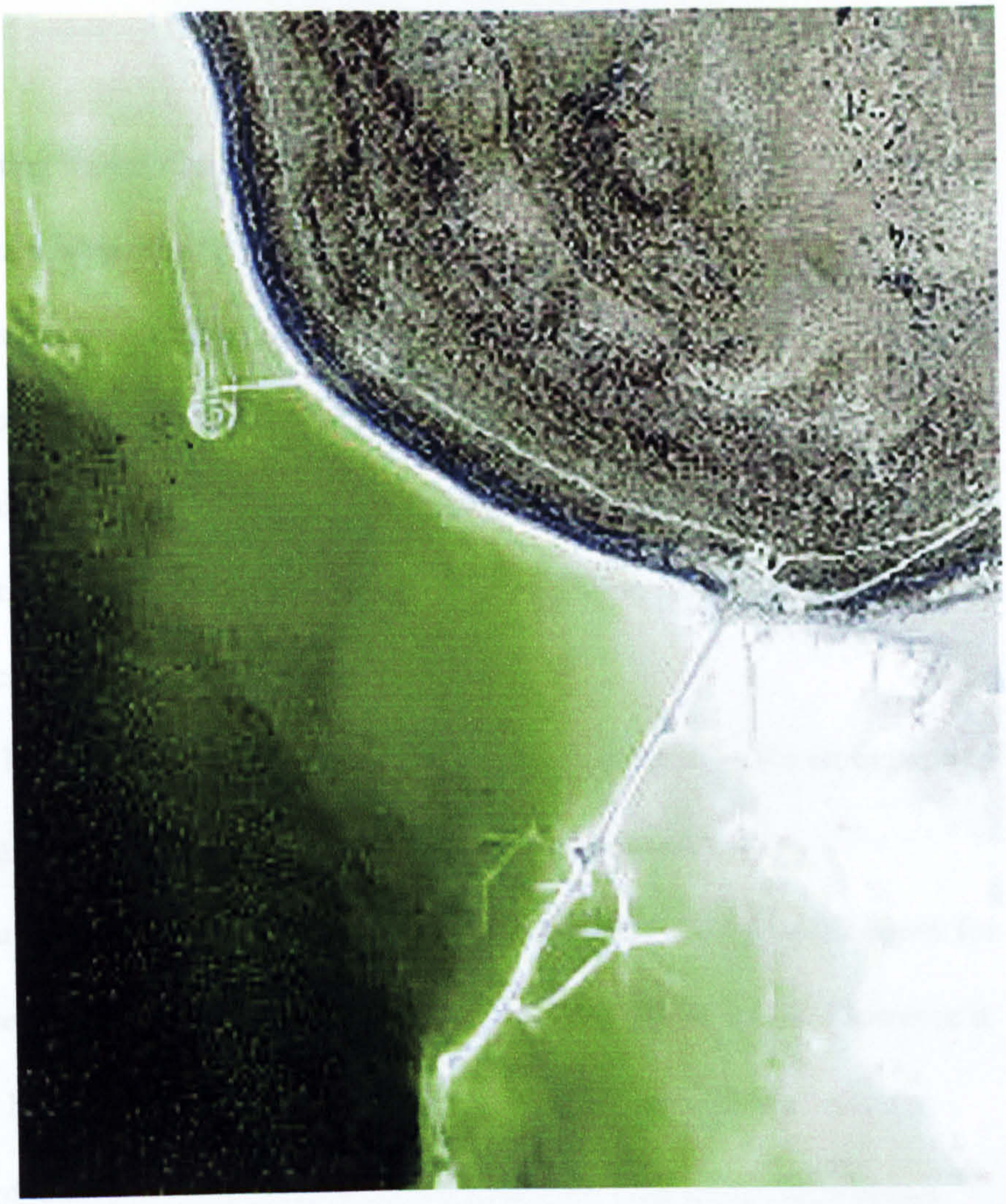
[497] This process had already begun as early as 1970 as Phillip Leider noted in his account of visiting the site with John Coplans, Nancy Holt and Smithson himself: 'Thick deposits of salt had outlined the piece in white. A completely unexpected yellow mineral had appeared, mixing with the rosy water and the salt crystals along many edges of the piece.' In 'How I Spent My Summer Vacation; or, Art and Politics in Nevada, Berkeley and Utah (Read about it in *Artforum*!)' *Artforum*, (Sept., 1970)

self-reflexivity. This is to say that it is a discursive system which has emerged *after* modernism and one which can observe its own reflections and the contingency of those very reflections/observations. It is by virtue of these two features that it provides modernist discourses, such as art history, with the potential to adapt to contemporary conditions and demands; and thus to survive. In the second half of the thesis I explored the implications of this adaptation by observing the following issues from the systems-theoretical perspective: the work of art, the gallery system, and, finally, the discursive systems of art history. In the final chapter (directly preceding this conclusion) I demonstrated the use of the systems-theoretical perspective as a means for discursive self reflection (a theme which runs throughout the entire thesis.)

But a number of questions remain unanswered. And this thesis is not an attempt to restore a theoretical hygiene to a discipline which might retain its vibrancy and creativity though being chaotically resistant to instrumental reason. I see it rather as a prolegomena to future research on the collaborative potential which can be realised when art history looks beyond its territorial restrictions (or to the environment within which its system operates.) Topics to be investigated in more detail include:

1 – A more thorough analysis of artistic and critical practice which actively engages with the vocabularies and methods of systems-thinking. I am thinking here of artists such as Burnhman, Haacke, Sol-Lewitt, Alloway, Bochner and Smithson (amongst others.)

2 – Looking to systems-theoretical perspective as a means by which to re-engage in the question of aesthetics in post-modern artistic practice



Spiral Jetty taken by Space Imaging's IKONOS satellite, 2003

Spiral Jetty, 2003, Picture by Author

(something that is often lost in the move away from the visual as the move away from Modernist artistic practice is often understood.)

3 – A thorough application of Luhmann's thought to an analysis of art and art history in the English language; in particular his reconfiguration of modernist self-reflexivity[498] from a systems-theoretical perspective and the implications for this on discursive self-reflexivity in general (and Art Historical self-reflection specifically.)

In conclusion Systems-Theory provides the means for an expanded sociology of art *and art history* in terms of system, environment, communication and control. Its most radical claim is that it can account for both itself and the objects which it observes in the same terms. However it has not been my intention to use these observations to (in the warning words of T.J.Clarke) diversify or disintegrate the systems of Art History,[499] and hence stifle politicised commentary. Rather, I see this incomplete project as an opportunity for Art History to rediscover its significance and its efficacy. And to do so without returning to business as usual. In theory at least.

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[498] This project would include a analysis of Luhmann's work in relation to Hegel (and discursive systems,) Habermas (and Modernity) and Husserl, (and the phenomenological project observed from systems-theory.)

[499] See, TJ Clarke, 'The Conditions of Artistic Creation,' in Fernie (ed.,) *Art History and its Methods*, (Phaidon, 1995)

Photograph by Author, Utah, April, 2003

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